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A comprehensive Directory of the leading machinery and supply manufacturers arranged for the convenience of contractors, engineers, water-works superintendents, municipal and county engineering departments, street and highway officials, city managers, etc., and public officials who may desire to secure catalogs or prices on construction equipment. Where the name of a manufacturer is preceded by a star (\*) it indicates that the user of the directory may secure further information by referring to the manufacturer's advertisement in this issue. The index to advertisers will be found on page facing the inside back cover.

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Sullivan Mch. Co., Chicago, Ill.  
United Iron Works, Kansas City, Mo.  
Westinghouse Trac. Brake Co., Wilmerding, Pa.  
Worthington Pump & Mch. Corp., N. Y. C.

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Murray Iron Works Co., Burlington, Ia.  
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Vort Mch'y. Co., Inc., Louisville, Ky.  
Walsh & Weldner Boiler Co., Chattanooga, Tenn.

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St. Louis Screw Co., St. Louis, Mo.  
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Bethlehem Steel Bridge Corp., Bethlehem, Pa.  
Blaw-Knox Co., Pittsburgh, Pa.  
Boston Bridge Works, Boston, Mass.  
Central States Bridge Co., Indianapolis, Ind.  
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Chesapeake Iron Works, Baltimore, Md.  
Chicago Bridge & Iron Works, Chicago, Ill.  
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Kiesler Co., J. F., Chicago, Ill.  
Lakewood Engineering Co., Cleveland, O.  
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Dobbie Foundry & Mach. Co., Niagara Falls, N. Y.  
Foundry Mfg. Co., St. Albans, Vt.  
Madison Foundry Co., Cleveland, O.  
Pechstein Iron Works, Keokuk, Ia.  
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Sessions Foundry Co., Bristol, Conn.  
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Ingersoll-Rand Co., N. Y. C.  
Mueller Mfg. Co., H., Decatur, Ill.

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Canton Art Metal Co., Canton, O.  
Newport Rolling Mill Co., Newport, Ky.  
Klauser Mfg. Co., Dubuque, Iowa.  
Mesker & Co., Geo. L., Evansville, Ind.  
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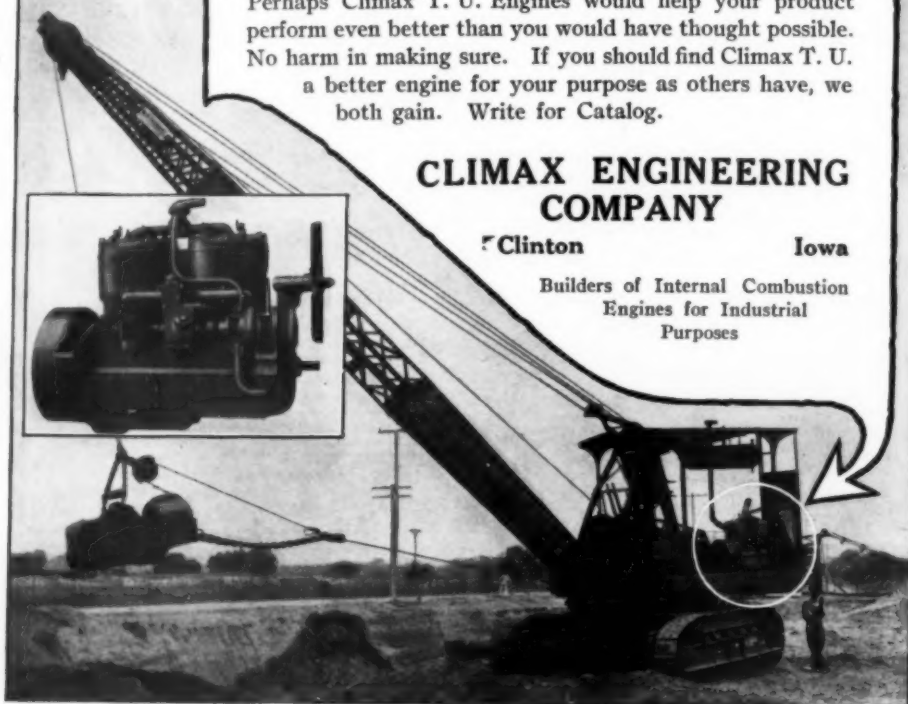
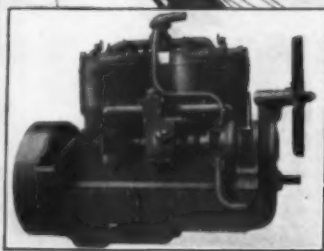
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 Bonner Portland Cement Co., Kansas City, Mo.  
 Canada Cement Co., Ltd., Montreal, Canada.  
 Cape Girardeau Portland Cement Co., Cape Girardeau, Mo.  
 Castalia Portland Cement Co., Pittsburgh, Pa.  
 Clinchfield Portland Cement Corp., Kingsport, Tenn.  
 Colorado Portland Cement Co., Denver, Colo.  
 Continental Portland Cement Co., St. Louis, Mo.  
 Coplay Cement Manufacturing Co., Coplay, Pa.  
 Cowell Portland Cement Co., San Francisco, Cal.  
 Crescent Portland Cement Co., Wampum, Pa.  
 Dewey Portland Cement Co., Kansas City, Mo.  
 Dexter Portland Cement Co., Nazareth, Pa.  
 Diamond Portland Cement Co., Cleveland, Ohio.  
 Dixie Portland Cement Co., Chattanooga, Tenn.  
 Edison Portland Cement Co., New York.  
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 Giant Portland Cement Co., Philadelphia, Pa.  
 Gilmore Portland Cement Corp., Gilmore City, Iowa.  
 Glens Falls Portland Cement Co., Glens Falls, N. Y.  
 Golden State Portland Cement Co., Los Angeles, Cal.  
 Gulf States Portland Cement Co., Demopolis, Ala.  
 Hawkeye Portland Cement Co., Des Moines, Ia.  
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 Hercules Cement Corp., Philadelphia, Pa.  
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 International Portland Cement Co., Ltd., Spokane, Wash.  
 Knickerbocker Portland Cement Co., Inc., New York.  
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 Lehigh Portland Cement Co., Allentown, Pa.  
 Louisville Cement Co., Louisville, Ky.  
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 New York & New England Cement & Lime Co., New York.  
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 Whitehall Cement Mfg. Co., Philadelphia, Pa.  
 Wolverine Portl'd Cement Co., Coldwater, Mich.  
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 Columbus McKinnon Chain Co., Columbus, O.  
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 Link-Belt Co., Chicago, Ill.  
 Niagara Metal Stamp Corp., Niagara Falls, N. Y.  
 U. S. Chain & Forge Co., Pittsburgh, Pa.  
 Webster Mfg. Co., Chicago, Ill.

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 Ludlow Valve Mfg. Co., Troy, N. Y.  
 Lunkenheimer Co., Cincinnati, O.  
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 Penna. Salt Mfg. Co., Philadelphia, Pa.

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 Custodis Chimney Const. Co., Alphons, New York.  
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#### CHLORINATORS

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 American Steel & Wire Co., Chicago, Ill.  
 Broderick & Bascom Rope Co., St. Louis, Mo.  
 Carpenter Co., Geo. B., Chicago, Ill.  
 Leachen & Sons Rope Co., A., St. Louis, Mo.  
 Marion Malleable Iron Works, Marion, Ind.  
 Mockbee & Co., C. M., Cincinnati, O.  
 Roebbing Sons Co., J. A., Trenton, N. J.  
 Upson-Walton Co., Cleveland, O.

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 \*Good Roads Mach'y Co., Kennett Square, Pa.  
 \*Hais Mfg. Co., Geo., New York.  
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 Corrugated Bar Co., Inc., Buffalo, N. Y.  
 Fairfield Engineering Co., Lancaster, Ohio.  
 Gifford-Wood Co., Hudson, N. Y.  
 Hayward Co., New York.  
 Hunt Co., Inc., C. W., West New Brighton, N. Y.  
 Jeffrey Mfg. Co., Columbus, O.  
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 Link-Belt Co., Chicago, Ill.  
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- Haydenville Co., Haydenville, Mass.
- Musler Mfg. Co., H., Decatur, Ill.

### COLUMN CLAMPS

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- Inaley Mfg. Co., Indianapolis, Ind.
- Universal Form Clamp Co., Chicago, Ill.

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- Anti-Hydro Waterproofing Co., Newark, N. J.
- General Chemical Co., New York.
- General Fireproofing Co., Youngstown, Ohio.
- Granitex Corp., New York.
- Horn Co., A. C., Long Island City, N. Y.
- Master Builders Co., Cleveland, O.
- Sonneborn Sons, Inc., L., N. Y. "Lapidolith"

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- \*Knickerbocker Co., Jackson, Mich.
- \*Smith Co., T. L., Milwaukee, Wis.
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- Atlas Engineering Co., Milwaukee, Wis.
- Austin Machinery Corp'n, Chicago, Ill.
- Badger Concrete Mixer Co., Milwaukee, Wis.
- Chain Belt Co., Milwaukee, Wis.
- Construction Mach'y Co., Waterloo, Iowa.
- Contractors' Equipment Co., Keokuk, Ia.
- Foots Concrete Mach'y Co., Chicago, Ill.
- Gray Iron Fdry Co., Reading, Pa.
- Jaeger Machine Co., Columbus, O.
- Judy Mfg. Co., Centerville, Ia.
- Lakewood Engineering Co., Cleveland, O.
- Lansing Co., Lansing, Mich.
- Marsh-Capron Co., Chicago, Ill.
- Oshkosh Mfg. Co., Oshkosh, Wis.
- Ransome Concrete Mach'y Co., Dunellen, N. J.
- Schramm & Son, Inc., Chris. D., West Chester, Pa.
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### CONCRETE REINFORCEMENT

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- General Fireproofing Co., Youngstown, O.
- Inland Steel Co., Chicago, Ill.
- Lackawanna Steel Co., Buffalo, N. Y.
- National Steel Fabric Co., Pittsburgh, Pa.
- Ryerson & Son, J. T., Chicago, Ill.
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- Locomotive Crane Co. of America, Champaign, Ill.
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- Link-Belt Co., Chicago, Ill.
- Northern Eng. Works, Detroit, Mich.
- Speldel, J. G., Reading, Pa.
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- U. S. Crane Co., Chicago, Ill.
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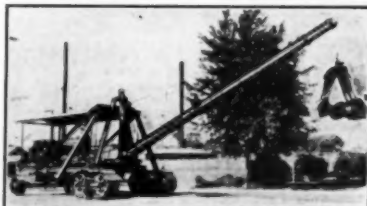
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Dobbie Fdry. & Mach. Co., Niagara Falls, N. Y.  
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Insley Mfg. Co., Indianapolis, Ind.  
Lakeside Bridge & Steel Co., N. Milwaukee, Wis.  
Lidgerwood Manufacturing Co., New York.  
Lincoln Iron Works, Rutland, Vt.  
National Hoisting Engine Co., Harrison, N. J.  
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Osgood Co., The, Marion, O.  
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PROVED AND  
ACCEPTED  
EXPANSION  
JOINT



Elastite performance itself is not affected by temperature. By resilient compressibility it takes up expansion and contraction in the concrete. It does not "squeeze out" above the surface, being highly compressible within its own volume. It does not wear down below the surface level.



## The water-tight, frost-tight, ever-elastic expansion joint

**E**LASTITE joints never open. Elastite yields as concrete expands under high temperatures and adheres tightly to both abutting slabs as the concrete contracts in low temperature, maintaining perfect continuous closure by resilient reaction from compression.

No opening can develop to fill with dirt or water, or to permit frost action to cause heaving.

Elastite retains its resiliency and compressibility without deterioration under all conditions of service and in all temperatures. Elastite never softens or runs in hot weather nor becomes brittle in low temperature.

It is preferable to any "poured" joint. Because of its preformed, built-up, construction its cost of installation is much less and it makes a better, stronger, more enduring, and more effective joint. Elastite protects against water seepage, frost, and injury from stresses set up by temperature changes.

### Where to use Elastite

In concrete, granite, brick, and wood-block streets, and highways — longitudinally and transversely about every 30 feet.

In cement sidewalks—every 30 feet, along curb, around posts and abutting buildings.

In bridges, viaducts, reservoirs, retaining walls, cement floors, and concrete structures of every character where temperature changes are likely to prove destructive.

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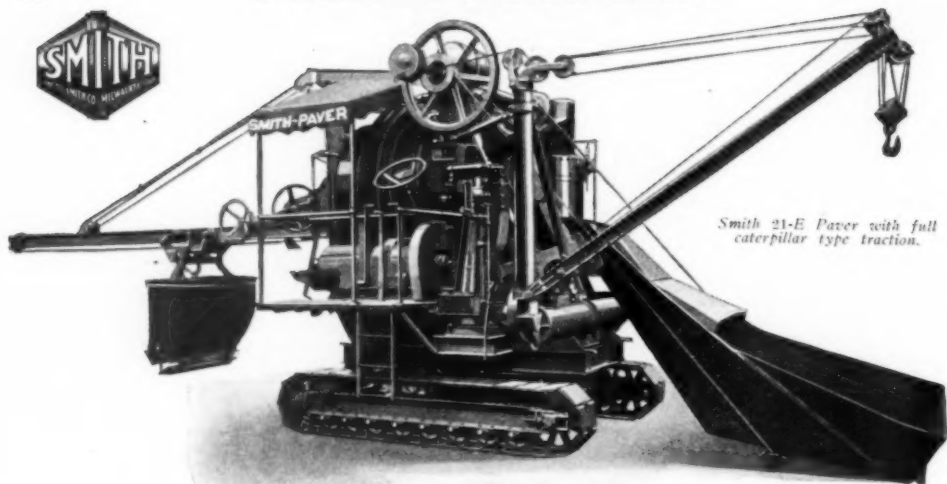
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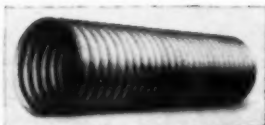
*First.* Buy from a reliable, well-established concern that has the will and the organization to treat you right and to furnish service.

*Second.* Buy a machine that will stand up under all conditions. The machine that *lasts* is the one that is profitable to use.

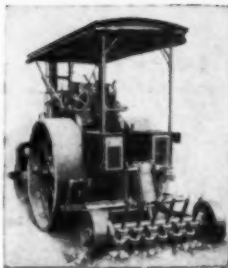
*Third.* Don't be too much concerned about price. Get your money's worth, but above all, get a good, serviceable machine.



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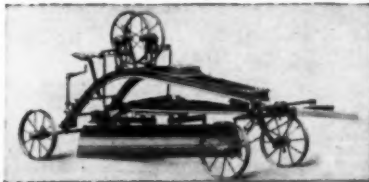
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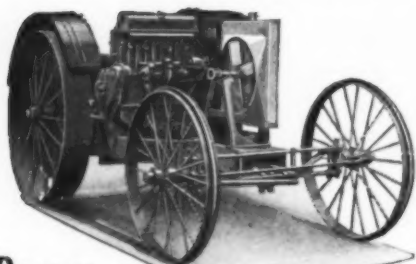
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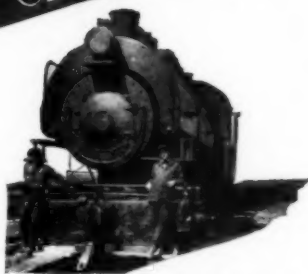
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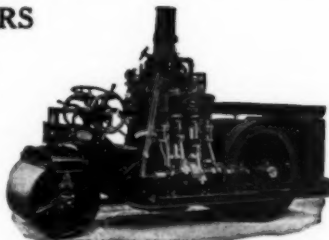
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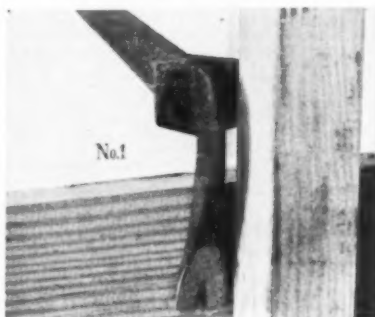
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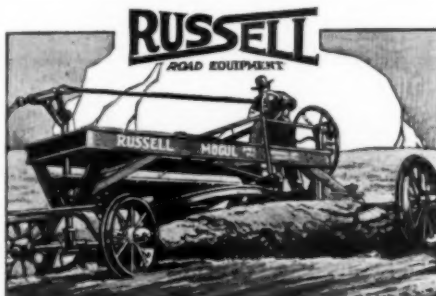
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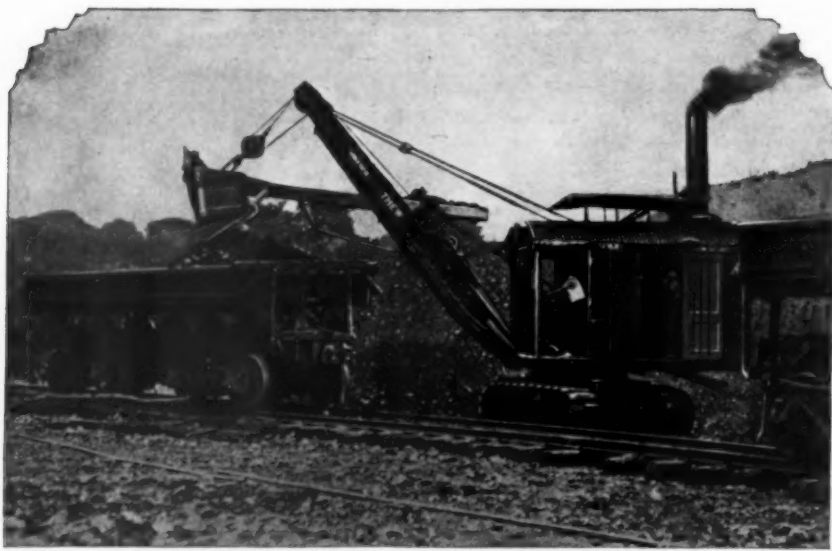
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Petroleum Iron Works Co., Sharon, Pa.  
Scaife & Sons Co., Wm. B., Pittsburgh, Pa.  
Walsh & Weldner Boiler Co., Chattanooga, Tenn.
- STEAM SHOVELS. (See Shovels, Steam)**
- STANDPIPES, TANKS AND TOWERS**  
\*Connery & Co., Inc., Philadelphia, Pa.  
\*Pacific Tank & Pipe Co., San Francisco, Cal.  
Caldwell Co., W. E., Louisville, Ky.  
Chattanooga Blr. & Tank Co., Chattanooga, Tenn.  
Chicago Bridge & Iron Works, Chicago, Ill.  
Lancaster Iron Wks., Lancaster, Pa.  
Petroleum Iron Works Co., Sharon, Pa.  
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.  
United Iron Works, Kansas City, Mo.  
Walsh & Weldner Boiler Co., Chattanooga, Tenn.
- STEAM TURBINES**  
Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
De Laval Steam Turbine Co., Trenton, N. J.  
Ingersoll-Rand Co., New York.  
Westinghouse Elec. & Mfg. Co., E. Pittsb'gh, Pa.
- STEEL PLATE CONSTRUCTION**  
\*Connery & Co., Philadelphia, Pa.  
\*Holl Co., The, Milwaukee, Wis.  
\*Littleford Bros., Cincinnati, O.  
Bethlehem Steel Bridge Co., Bethlehem, Pa.  
Biggs Boiler Wks., Akron, O.  
Birmingham Steel Corp., Birmingham, Ala.  
Blaw-Knox Co., Pittsburgh, Pa.  
Chatta. Boiler & Tank Co., Chattanooga, Tenn.  
Chicago Bridge & Iron Works, Chicago, Ill.  
Helzel Steel Form & Iron Co., Warren, O.  
Hendrick Mfg. Co., Carbondale, Pa.  
Honhorst Co., Jos., Cincinnati, Ohio.  
McClintie-Marshall Co., Pittsburgh, Pa.  
Pennsylvania Bridge Co., Beaver Falls, Pa.  
Petroleum Iron Works Co., Sharon, Pa.  
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.  
Ritter-Conley Co., Pittsburgh, Pa.  
Scaife & Sons, Wm. B., Pittsburgh, Pa.  
Toledo Crane Co., Toledo, O.  
Union Iron Works, Hoboken, N. J.  
Vulcan Iron Works, Jersey City, N. J.  
Walsh & Weldner Boiler Co., Chattanooga, Tenn.
- STOKERS, MECHANICAL**  
Rabeneck & Wilcox Co., N. Y. O.  
Westinghouse Elec. & Mfg. Co., E. Pittsb'gh, Pa.
- STREET AND ROAD SIGNS. (See Signs, Street and Road.)**
- STREET CLEANERS' CARTS**  
\*Rochester Can Co., Rochester, N. Y.  
\*Tarran Can & Iron Works, Brooklyn, N. Y.  
Tarrant Mfg. Co., Saratoga Springs, N. Y.



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### *Jobs on Which Cletrac Will Save You Money*

Pulling Ditching Machines  
Pulling Rooter and Grading Plows  
Handling Fresno or Wheel Scrapers  
Pulling Graders and Levelers  
Hauling Away Dirt  
Bringing in Material  
Operating Stone Crusher, Gravel Screening  
Mill, Concrete Mixers, Conveyors and  
Elevators  
Pulling Heavy Rollers  
Pulling or Pushing Snow Plows  
Cleaning Roadside Drains  
Mowing Roadside  
Work in and out of excavations  
Hauling Dump Cars on Industrial Railroad  
Building Golf Courses and Parks  
Mowing and General Maintenance of Golf  
Courses and Parks



HARD THIS  
WAY, BUT—

EASY ON A TRACK  
THE CLETRAC WAY



THIS illustration gives you a good idea of Cletrac's unusual ability on all sorts of contracting jobs. Because of its common sense crawler-type construction, Cletrac gets over ditches and up steep grades that would be impossible for horses.

Here is a tractor with abundant power to pull road graders scrapers and ditchers—to operate the concrete mixer, stone crusher, screening mill and almost any other belt job you put up to it. It is ruggedly built for steady, lasting service.

Cletrac's ability to work over all kinds of ground in all sorts of weather makes it an invaluable power unit for the contractor no matter what his particular line of work. It has earned a reputation for doing "more kinds of work more days per year," for saving time and money on every job it tackles.

Let us give you some actual figures on contracting jobs recently completed—they will *prove* Cletrac's remarkable money-saving ability. Then go to your nearest Cletrac dealer for a demonstration.

### THE CLEVELAND TRACTOR COMPANY

*Largest Producers of Tank-Type Tractors in the World*

19211 Euclid Ave.

Cleveland, Ohio



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- \*Autocar Co., Ardmore, Pa.
- \*General Motors Truck Co., Pontiac, Mich.
- \*Municipal Supply Co., South Bend, Ind.
- Etnyre & Co., E. D., Oregon, Ill.
- Federal Motor Truck Co., Detroit, Mich.
- Four Wheel Drive Auto Co., Clintonville, Wis.
- Int'l. Harvester Co. of Am., Chicago, Ill.
- International Motor Co., New York.
- Packard Motor Car Co., Detroit, Mich.
- Pierco Arrow Motor Car Co., Buffalo, N. Y.
- Service Motor Truck Co., Wabash, Ind.
- Tiffin Wagon Co., Tiffin, O.
- White Co., Cleveland, O.

## STREET LAMP POSTS

- Electric Railway Equipment Co., Cincinnati, O.
- General Electric Co., Schenectady, N. Y.
- King Mfg. Co., Chicago, Ill.
- Union Metal Mfg. Co., Canton, O.
- Westinghouse Elec. & Mfg. Co., E. Pittsb'gh, Pa.

## STREET SWEEPERS

- \*Austin-Western Road Machy. Co., Chicago, Ill.
- \*Good Roads Mach. Co., Kennett Square, Pa.
- Elgin Sales Corp'n, New York.
- Tiffin Wagon Co., Tiffin, O.
- Universal Road Machy. Co., Kingston, N. Y.

## STRUCTURAL STEEL AND IRON. (See Bridges and Buildings)

## STUMP PULLERS

- Bennett & Co., H. L., Westerville, O.
- Clyde Iron Works, Duluth, Minn.
- Lewis & Valentine, Reolyn, L. I.
- Thomas Elevator Co., Chicago, Ill.

## SURVEYORS' INSTRUMENTS. (See Instruments.)

## SWITCHES AND PROGS

- \*Koppel Ind. Car & Equip. Co., Koppel, Pa.
- \*Light Ry. & Equipment Co., Philadelphia, Pa.

## TABLES AND BOARDS, DRAWING. (See Drawing Materials.)

## TAMPING MACHINES

- \*Pawling & Harnishfeger Co., Milwaukee, Wis.
- Construction Mach'y Co., Waterloo, Ia.

## TANKS, AIR COMPRESSOR

- \*Connery & Co., Inc., Philadelphia, Pa.
- \*Hell Co., Milwaukee, Wis.
- \*Littleford Bros., Cincinnati, O.
- Abendroth & Root Mfg. Co., New York.
- Biggs Boiler Wks., Akron, O.
- Indiana Air Pump Co., Indianapolis, Ind.
- Chicago Bridge & Iron Works, Chicago, Ill.
- Ingersoll-Rand Co., New York.
- Lancaster Iron Wks., Lancaster, Pa.
- National Tube Co., Pittsburgh, Pa.
- Petroleum Iron Works Co., Sharon, Pa.
- Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
- Scalfe & Sons Co., Wm. B., Pittsburgh, Pa.
- Westinghouse Tract. Engrs. Co., Wilmerding, Pa.
- Worthington Pump & Machy. Corp., New York.

## TANKS FOR OIL

- \*Connery & Co., Philadelphia, Pa.
- \*Hell Co., Milwaukee, Wis.
- \*Littleford Bros., Cincinnati, O.
- \*Pacific Tank & Pipe Co., San Francisco, Cal.
- Biggs Boiler Works Co., Akron, O.
- Bowser & Co., Inc., S. F., Fort Wayne, Ind.
- Chatta. Boiler & Tank Co., Chattanooga, Tenn.
- Chicago Bridge & Iron Works, Chicago, Ill.
- Dover Boiler Works, New York.
- Fouts Co., C. C., Middletown, O.
- Honhorst Co., Jos., Cincinnati, Ohio.
- Petroleum Iron Works Co., Sharon, Pa.
- Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
- Riter-Conley Co., Pittsburgh, Pa.
- Scalfe & Sons Co., Wm. B., Pittsburgh, Pa.
- United Iron Works, Kansas City, Mo.
- Walsh & Weldner Boiler Co., Chattanooga, Tenn.
- Wayne Oil Tank & Pump Co., Ft. Wayne, Ind.

## TANKS, STEEL

- \*Connery & Co., Philadelphia, Pa.
- \*Hell Co., Milwaukee, Wis.
- \*Littleford Bros., Cincinnati, O.
- Avery Co., Peoria, Ill.
- Biggs Boiler Wks., Akron, O.
- Case Threshing Mach. Co., J. I., Racine, Wis.
- Caldwell Co., W. E., Louisville, Ky.
- Chatta. Boiler & Tank Co., Chattanooga, Tenn.
- Chicago Bridge & Iron Works, Chicago, Ill.
- Columbian Steel Tank Co., Kansas City, Mo.
- Hardcast Mfg. Co., R., Denver, Col.
- Hendrick Mfg. Co., Carbondale, Pa.
- Honhorst Co., Jos., Cincinnati, Ohio.
- Lancaster Iron Works, Lancaster, Pa.

Milwaukee Corrugating Co., Milwaukee, Wis.

- Petroleum Iron Works Co., Sharon, Pa.
- Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
- Scalfe & Sons, Wm. B., Oakmont, Pa.

## TANKS, WOOD

- Caldwell Co., W. E., Louisville, Ky.
- Davis & Son, G. M., Palatka, Fla.
- Eagle Tank Co., Chicago, Ill.
- Hauser-Stander Tank Co., Cincinnati, O.
- Kalamazoo Tank & Silo Co., Kalamazoo, Mich.
- National Tank & Pipe Co., Portland, Ore.
- Pacific Tank & Pipe Co., San Francisco, Calif.
- Redwood Manufacturers Co., San Francisco, Calif.
- Stearns Lumber Co., A. T., Boston, Mass.
- U. S. Wind Engine & Pump Co., Batavia, Ill.
- Wendnagel & Co., Chicago, Ill.

## TANK WAGONS

- \*Acme Road Mach. Co., Frankfurt, N. Y.
- \*Hell Co., Milwaukee, Wis.
- Avery Co., Peoria, Ill.
- Case Threshing Mach. Co., J. I., Racine, Wis.
- International Motor Co., New York.

## TAPES, STEEL AND METALLIC

- Dietgen Co., Eugene, New York.
- Keuffel & Esser Co., Hoboken, N. J.
- Lufkin Rule Co., Saginaw, Mich.
- Starrett, L. S., Athol, Mass.

## TAPPING MACHINES

- Hays Mfg. Co., Erie, Pa.
- Mueller Mfg. Co., H., Decatur, Ill.
- Smith Mfg. Co., A. P., E. Orange, N. J.

## TAB

- Barrett Co., New York.

## TAB KETTLES. (See Kettles)

## TIES, STEEL

- \*Koppel Industrial Car & Equip. Co., Koppel, Pa.
- \*Light Ry. & Equipment Co., Philadelphia, Pa.
- Carnegie Steel Co., Pittsburgh, Pa.
- Sweet's Steel Co., Williamsport, Pa.

## TIRES, RUBBER. (For Motor Trucks.)

- Firestone Tire & Rubber Co., Akron, O.
- Goodrich Rubber Co., B. F., Akron, O.
- Goodyear Tire & Rubber Co., Akron, O.
- Kelly Springfield Tire Co., New York.
- Republic Rubber Co., Youngstown, O.
- U. S. Tire Co., New York.

## TOOL HOUSES, PORTABLE STEEL

- \*Littleford Bros., Cincinnati, O.

## TOWERS. (See Standpipe Tanks and Towers)

## TRACKS, INDUSTRIAL AND PORTABLE

- \*Koppel Ind. Car & Equipment Co., Koppel, Pa.
- \*Light Ry. Equipment Co., Philadelphia, Pa.
- Chase Fdry. & Mfg. Co., Columbus, O.
- Easton Car & Constn. Co., New York.
- Hunt Co., Inc., C. W., West New Brighton, N. Y.
- Lakewood Engineering Co., Cleveland, O.

## TRACTORS

- \*Cleveland Tractor Co., Cleveland, O.
- \*Elliott Mfg. Co., Peoria, Ill.
- \*Huber Mfg. Co., Marion, O.
- Advance-Rumely Thresher Co., Laporte, Ind.
- Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- Avery Co., Peoria, Ill.
- Barrett-Cravens Co., Chicago, Ill.
- Bates Machine & Tractor Co., Joliet, Ill.
- Best Tractor Co., C. L., San Leandro, Cal.
- Case Threshing Machine Co., J. I., Racine, Wis.
- Clark Tractor Co., Chicago, Ill.
- Dart Truck & Tractor Corp., Waterloo, Ia.
- Dayton-Dowd Co., Quincy, Ill.
- Fairbanks, Morse & Co., Chicago, Ill.
- Four Wheel Drive Auto Co., Clintonville, Wis.
- Hart-Parr Co., Charles City, Iowa.
- International Motor Co., New York.
- J. T. Tractor Co., Cleveland, O.
- Oliver Tractor Co., Knoxville, Tenn.
- Selden Truck Corp'n., Co., Wabash, Ind.
- Service Motor Truck Co., Wabash, Ind.
- Watson Products Corp., Canastota, N. Y.
- White Company, The, Cleveland, O.

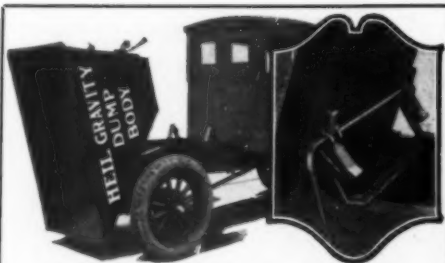
## TRAFFIC PAINT

- Hoosier Paint Wks., Ft. Wayne, Ind.
- Tropical Paint & Oil Co., Cleveland, Ohio.

## TRAFFIC SIGNS

- Electrical & Specialty Supply Co., Chicago, Ill.
- Elkhart Fdry. & Mach. Co., Elkhart, Ind.
- Federal Signal Co., Albany, N. Y.
- Ingram-Richardson Mfg. Co., Beaver Falls, Pa.
- Lyle Culvert & Road Eq. Co., Minneapolis, Minn.
- Thompson-Fleming, Inc., Buffalo, N. Y.
- Union Iron Products Co., E. Chicago, Ind.

\* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.



### \$100.00 Buys One Yard GRAVITY DUMP BODY

This body is made of No. 12 gauge steel. It is welded inside and outside by the electric process to make it water tight for handling wet mix.

Self locking hooks hold the body firmly in place. When released the weight tips the body over to an 80 degree dumping angle. Heavy coil springs on the control rods allow the body to roll over without any decided shock to the truck. Body can be mounted on truck in a few minutes.

"U" bolts and wood sills are furnished. Special price on lots of five or ten bodies.

Write for circular No. 118 describing equipment.

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1243 26th AVENUE, MILWAUKEE, WIS.

Manufacturers of Hydro Hoists  
and Steel Dump Bodies



### UNIT WHEELERS



Are Simple  
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No intricate springs, endless chains, or difficult latches to operate. Their very simple mechanism and ease of operation make them the favorite power scraper. Capacity, measured, 20 cu. ft., heaped load, 22 cu. ft.

Write for special bulletin L118

**Smith & Sons Manufacturing Co.**  
1512 Guinotte Ave., Kansas City, Mo.



## ONE MORE ACME TRIUMPH The FOUR-CYLINDER MOTOR ROAD ROLLER WITH AN AIR PRESSURE CONTROLLED SCARIFIER ACME ROAD MACHINERY CO.

Factory—FRANKFORT, N. Y.

BRANCHES: { Boston, Mass. Baltimore, Md. Chicago, Ill.  
New York City Cincinnati, Ohio.



10 Gallon Capacity

## CONNERYS' Tar and Asphalt Heaters

Non-Leakable Welded—"Held by the Weld." 20 Styles.

10 to 1000 Gallon Capacity Carried in Stock.

This kettle (10-gallon capacity) is ideal for road contractors and is especially made for small patch work where there are a considerable number of small holes to be properly filled up with gravel or crushed stone and cemented with bituminous binder. The inside pot lifts out and can readily be used as a pouring pot.

Send your name for illustrated material on all sizes and styles.

**CONNERYS & CO., Inc.**  
400 N. SECOND STREET, PHILADELPHIA, PA.

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Arcadia Trailer Corp., Newark, N. Y.  
Eagle Wagon Works, Auburn, N. Y.  
Highway Trailer Co., Edgerton, Wis.  
Lee Trailer & Body Co., Chicago, Ill.  
Troy Wagon Works, Troy, O.  
Warner Mfg. Co., Beloit, Wis.  
Watson Products Corp., Canastota, N. Y.

## TRAILERS, INDUSTRIAL

Chase Fdry. & Mfg. Co., Columbus, O.  
Electric Wheel Co., Quincy, Ill.  
Lakewood Engineering Co., Cleveland, O.  
Lee Trailer & Body Co., Chicago, Ill.

## TEAMWAYS, AERIAL WIRE ROPE

Broderick & Bassom Rope Co., St. Louis, Mo.  
Leschen & Sons Rope Co., A., St. Louis, Mo.

## TRANSFORMERS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
General Electric Co., Schenectady, N. Y.  
Kuhlman Electric Co., Bay City, Mich.  
Westinghouse Elec. & Mfg. Co., E. Pittsb'gh, Pa.

## TRANSITS AND LEVELS. (See Instruments.)

## TRANSMISSION MACHINERY, POWER

\*Weller Mfg. Co., Chicago.  
Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
Chain Belt Co., Milwaukee, Wis.  
Dodge Mfg. Co., Mishawaka, Ind.  
General Electric Co., Schenectady, N. Y.  
Link-Belt Co., Chicago, Ill.  
Webster Mfg. Co., Chicago, Ill.

## TRASH CANS. (See Cans)

## TREADS, SAFETY

American Abrasive Metals Co., New York.  
American Mason Safety Tread Co., Lowell, Mass.  
Concrete Steel Co., New York.  
Hendrick Mfg. Co., Carbondale, Pa.  
Norton Co., Worcester, Mass.

## TRENCH BRACES. (See Braces, Trench)

## TRENCH EXCAVATORS. (See Excavators, Ditch & Trench)

## TRENCH PUMPS. (See Pumps, Contractors')

## TURBINES

Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
De Laval Steam Turbine Co., Trenton, N. J.  
General Electric Co., Schenectady, N. Y.  
Ingersoll-Rand Co., New York.  
Midwest Engine Co., Indianapolis, Ind.  
Westinghouse Elec. & Mfg. Co., E. Pittsb'gh, Pa.

## USED MACHINERY

(See Contractors' Used Equipment.)

## VALVE CONTROL APPARATUS, ELECTRIC

Payne Dean, Ltd., New York.

## VALVES, GATE AND INDICATOR POSTS

Chapman Valve Mfg. Co., Indian Orchard, Mass.  
Crane Company, Chicago, Ill.  
Darling Valve & Mfg. Co., Williamsport, Pa.  
Eddy Valve Co., Waterford, N. Y.  
Fairbanks Co., The, New York.  
Iowa Valve Co., Oskaloosa, Ia.  
Kennedy Valve Mfg. Co., Elmira, N. Y.  
Ludlow Valve Co., Troy, N. Y.  
Lunkenheimer Co., Cincinnati, O.  
Pratt & Cady Co., Inc., Hartford, Conn.  
Reading Steel Casting Co., Inc., Bridgeport, Conn.

## VALVE BOXES AND HOUSINGS

Rensselaer Valve Co., Troy, N. Y.  
Smith Mfg. Co., A. P., East Orange, N. J.  
Wood & Co., R. D., Philadelphia, Pa.  
\*Central Foundry Co., New York.  
\*Clark Co., H. W., Mattoon, Ill.  
\*U. S. C. Ir. Pipe & Fdry. Co., Burlington, N. J.

## VALVE BOXES AND HOUSINGS

Chapman Valve Mfg. Co., Indian Orchard, Mass.  
Clow & Sons, J. B., Chicago, Ill.  
Columbian Iron Works, Chattanooga, Tenn.  
Darling Valve & Mfg. Co., Williamsport, Pa.  
Eddy Valve Co., Waterford, N. Y.  
Fairbanks Co., The, New York.  
Iowa Valve Co., Oskaloosa, Ia.  
Kennedy Valve Mfg. Co., Elmira, N. Y.  
Ludlow Valve Co., Troy, N. Y.  
Mueller Mfg. Co., H., Decatur, Ill.  
Pratt & Cady Co., Inc., Hartford, Conn.  
Rensselaer Valve Co., Troy, N. Y.  
Smith Mfg. Co., A. P., East Orange, N. J.  
S. E. T. Valve & Hydrant Co., New York.  
Wood & Co., R. D., Philadelphia, Pa.

## VENTILATORS

American Blower Co., Detroit, Mich.  
Edwards Mfg. Co., Cincinnati, O.  
Milwaukee Corrugating Co., Milwaukee, Wis.

## WAGONS. (See Dump Carts and Wagons.)

## WAGON BODIES. (See Dump Bodies)

## WAGON LOADERS. (See Loaders, Gravel and Wagons)

## WALLBOARD

\*Carey Co., Philip, Cincinnati, Ohio.  
Beaver Board Companies, Buffalo, N. Y.  
Bird & Son, Inc., E. Walpole, Mass.  
Cornell Wood Products Co., Chicago, Ill.  
Haverhill Box Board Co., Haverhill, Mass.  
MacAndrews & Forbes Co., New York, N. Y.  
Plastering Wall Board Co., Buffalo, N. Y.  
United States Gypsum Co., Chicago, Ill.  
Upson Co., The, Lockport, N. Y.  
Waldorf Paper Products Co., St. Paul, Minn.

## WALL TIES

Concrete Steel Co., New York, N. Y.  
Consolidated Expanded Metal Co., Braddock, Pa.  
Berger Mfg. Co., Canton, O.  
Milwaukee Corrugating Co., Milwaukee, Wis.  
Niagara Metal Stamp Corp., Niagara Falls, N. Y.

## WATER MAIN CLEANING

\*National Water Main Cleaning Co., New York.

## WATER MAIN TAPPING MACHINES

Mueller Mfg. Co., H., Decatur, Ill.  
Smith Mfg. Co., A. P., East Orange, N. J.

## WATER METERS. (See Meters, Water and Oil.)

## WATERPROOFING COMPOUNDS AND MATERIAL

\*Barber Asphalt Paving Co., Philadelphia, Pa.  
\*Carey Company, Philip, Cincinnati, O.  
\*Standard Oil Co. (Indiana), Chicago, Ill.  
\*Truscon Company, New York.  
Anti-Hydro Waterproofing Co., Newark, N. J.  
Atlantic Refining & Asphalt Corp., Phil'a, Pa.  
Barrett Company, New York.  
General Fireproofing Co., Youngstown, O.  
Granitex Corp., New York.  
Horn Co., A. C., Long Island City, N. Y.  
Master Builders' Co., Cleveland, O.  
Minwax Co., The, New York.  
Protecol Corp., New York.  
Ruberoid Co., New York.  
Sonneborn Sons, Inc., New York.  
Toch Brothers, New York.

## WATER PURIFICATION

\*Wallace & Tiernan Co., Inc., Newark, N. J.  
Clow & Sons, J. B., Chicago, Ill.  
Electro Bleaching Gas Co., New York.  
N. Y. Continental Jewell Filter Co., Nutley, N. J.  
Mathieson Alkali Works, Inc., New York.  
Norwood Eng. Co., Florence, Mass.  
Penna. Salt Mfg. Co., Philadelphia, Pa.  
Permutit Co., New York.  
Pittsburgh Filter & Eng. Co., Pittsburgh, Pa.  
R. U. V. Company, New York.  
Roberts Filter Co., Darby, Pa.  
Scaife & Sons Co., Wm. B., Pittsburgh, Pa.

## WATER REGULATORS

\*Union Water Meter Co., Worcester, Mass.  
Mueller Mfg. Co., Decatur, Ill.  
Pacific Flush Tank Co., Chicago, Ill.

## WATER SOFTENERS

American Water Softener Co., Philadelphia, Pa.  
Borromite Co., Chicago, Ill.  
International Filter Co., Chicago, Ill.  
N. Y. Continental Jewell Filter Co., Nutley, N. J.  
Permutit Company, New York.  
Pittsburgh Filter & Eng. Co., Pittsburgh, Pa.  
Refinite Co., Omaha, Neb.  
Roberts Filter Mfg. Co., Darby, Pa.  
Scaife & Sons, W. B., Pittsburgh, Pa.

## WATER WHEELS

\*Allis-Chalmers Mfg. Co., Milwaukee, Wis.  
Lefel & Co., Jas., Springfield, O.  
Pelican Water Wheel Co., San Francisco, Cal.  
Smith Company, S. Morgan, York, Pa.

## WELDING APPARATUS

General Electric Co., Schenectady, N. Y.  
Milburn Company, Alex., Baltimore, Md.  
Oxweld Acetylene Co., Newark, N. J.

## WELL SCREENS

\*Johnson, Edw. E., Inc., St. Paul, Minn.

## WELL-DRILLING AND BLAST HOLE MACHINES

American Well Works, Aurora, Ill.  
Armstrong Mfg. Co., Waterloo, Iowa.  
Keystone Driller Co., Beaver Falls, Pa.  
Leidecker Tool Co., Marietta, Ohio.  
Loomis Machine Co., Tiffin, O.  
Sanderson Cyclone Drill Co., Orrville, Ohio.  
Sparta Iron Wks. Co., Sparta, Wis.  
Star Drilling Machine Co., Akron, O.

## WHEELBARROWS

Akron Barrow Co., Cleveland, O.

Jackson Mfg. Co., Harrisburg, Pa.  
 Kilbourne & Jacobs Mfg. Co., Columbus, O.  
 Lansing Co., Lansing, Mich.  
 Sidney Steel Scraper Co., Sidney, O.  
 Sterling Wheelbarrow Co., Milwaukee, Wis.  
 Stuebner Iron Wks., G. L., Long Island City,  
 N. Y.

Toledo Wheelbarrow Co., Toledo, O.

#### WINDOW FRAMES AND SASH (Metallic.)

\*Truscon Steel Co., Youngstown, O.  
 Bayley Co., Wm., Springfield, O.  
 Detroit Steel Products Co., Detroit, Mich.  
 Lupton's Sons Co., David, Philadelphia, Pa.

#### WIRE AND CABLE

\*Hazard Mfg. Co., Wilkesbarre, Pa.  
 American Steel & Wire Co., Chicago, Ill.  
 General Electric Co., Schenectady, N. Y.  
 Habirshaw Elec. Cable Co., Inc., N. Y. C.  
 Macwhyte Co., Kenosha, Wis.  
 National India Rubber Co., Bristol, R. I.  
 New York Insulated Wire Co., New York.  
 Okonite Co., Passaic, N. J.  
 Roebling's Sons Co., J. A., Trenton, N. J.  
 Safety Ins. Wire & Cable Co., New York.  
 Simplex Wire & Cable Co., Boston, Mass.

Standard Underground Cable Co., Pittsburgh, Pa.  
 Tubular Woven Fabric Co., Pawtucket, R. I.  
 Waterbury Co., New York.

#### WIRE GLASS

Mississippi Wire Glass Co., New York.

#### WIRE MESH REINFORCEMENT

American Steel & Wire Co., Chicago, Ill.  
 National Steel Fabric Co., Pittsburgh, Pa.  
 Wickwire Spencer Steel Corp., Worcester, Mass.

#### WIRE ROPE. (See Rope, Wire.)

#### WOODWORKING MACHINES

Fairbanks, Morse & Co., Chicago, Ill.  
 Ransome Concrete Mach. Co., Dunellen, N. J.

#### WOOD PRESERVATIVES

\*Truscon Laboratories, Detroit, Mich.  
 Barrett Company, New York.  
 General Chemical Co., New York.  
 Protexol Corp., New York.  
 Republic Preserving Co., Indianapolis, Ind.

#### WRECKING BARS

\*Anderson Bros. Mfg. Co., Rockford, Ill.

#### WRENCHES

Erie Tool Works, Erie, Pa.  
 Greene, Tweed & Co., New York.  
 Lowell Wrench Co., Worcester, Mass.



## BURCH STONE SPREADERS

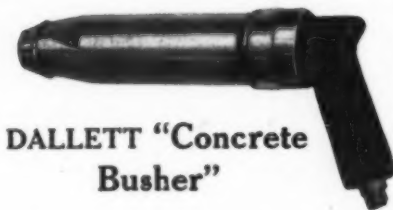
Use the exact amount of slag, gravel or stone needed on the roadbed, spreading it from the back of the truck to the required width and depth. They do it cheaper and better than men.

#### SAVING IS GREAT

A Burch Spreader will pay for itself in a mile in the saving of wages and material. It will expedite road work, reduce the cost of supervision and in every way improve the job.

Write to us for the experience of contractors with it.

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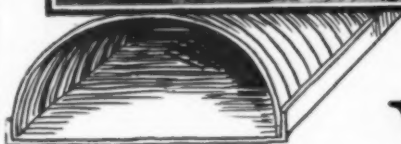


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# CONTRACTORS' & ENGINEERS' MONTHLY

A PURCHASING GUIDE FOR ENGINEERS, CONTRACTORS, PUBLIC OFFICIALS AND OTHER PURCHASERS  
OF CONSTRUCTION MATERIALS AND EQUIPMENT

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# Contractors' & Engineers' Monthly

Vol. IV, No. 3

New York, N. Y.

March, 1922

## A Code of Ethics for the Building Industry

THE Congress of the Building Industry of the City of New York, through its recently formulated Code of Ethics, seeks a high standard of conduct and character among its members in respect to themselves and the public whom they serve. As a safeguard of the important financial, technical, esthetic and industrial interests intrusted to its members, it aims to put into practical every-day use this well-thought-out code.

The building industry, broadly considered, includes the owner, the real estate broker, the banker, the loan broker, the architect, the engineer, the contractor and the subcontractor, the material manufacturer and the dealer, and labor. Among certain of these groups professional codes of ethics have long been in use, but the Congress believes that there is need for the development of a general code that will define fair dealings for all. No set of rules can be formulated which will particularize all the duties of all branches of the industry in their relation to the public and to each other. The following principles should, however, govern and serve as a guide. All ethical rules may in the final analysis be comprehended within the statement of the Golden Rule.

### ARTICLE 1—GENERAL

It is unethical for anyone engaged in the building industry or any of its branches:

Sec. 1. To unduly or improperly increase the cost of the work or to produce work or workmanship inferior to that contracted for.

Sec. 2. To falsely or maliciously injure the reputation or business of another.

Sec. 3. To offer or accept commissions intended to influence sales or contracts.

Sec. 4. To endeavor to circumvent the fair and reasonable enforcement of building ordinances and safety and sanitary codes.

Sec. 5. To resort to or countenance "shopping."

### ARTICLE 2—THE OWNER

Sec. 1. To call for unnecessary or full estimates on tentative projects, or from unacceptable bidders, or to withhold proper facilities from those estimating.

Sec. 2. To refuse credit data and statement as to reality of the project.

Sec. 3. To deal directly with the contractor where an engineer or architect has been employed for full services including supervision.

Sec. 4. To place upon the contractor under a lump sum contract the moral responsibility of acting in a judicial capacity on his own work.

Sec. 5. To endeavor to improperly influence the architect's or engineer's decisions as to contract obligations.

### ARTICLE 3—THE BANKER

Sec. 1. To fail to give due weight to the community value of improvements for which loans are desired.

Sec. 2. To fail to acquaint the borrower with all conditions (especially as to approval of materials and construction) under which the loan is made.

Sec. 3. To overload building costs with fees, commissions or bonuses not legitimately earned.

### ARTICLE 4—THE REAL ESTATE BROKER

Sec. 1. To misrepresent conditions or conceal any facts having an important bearing upon the real value of a property.

Sec. 2. To advise a type of development opposed to the community interest.

### ARTICLE 5—THE ARCHITECT AND ENGINEER

Sec. 1. To act in any other than a judicial capacity in determining contract obligations; or to fail to require full performance equally by owner and contractor.

Sec. 2. To require a contractor to perform for him any part of the service which is generally recognized as the architect's work.

Sec. 3. To cover possible oversights or errors by indefinite clauses in contract or specifications.

Sec. 4. To withhold certificates for payment when properly due under a contract.

Sec. 5. To engage in the building trades.

#### ARTICLE 6—THE CONTRACTOR

Sec. 1. To give, knowingly, work or workmanship inferior to that contracted for.

Sec. 2. To endeavor to supplant the architect or engineer with the owner.

Sec. 3. To submit to the owner directly, without the architect's approval or knowledge, any proposals or estimates.

Sec. 4. To fail to recognize his moral obligations to sub-contractors whose bids he has used in making his own proposal.

Sec. 5. To knowingly or carelessly underestimate the value of any work.

Sec. 6. To withhold payment to sub-contractors

and dealers for work or for materials for which he has received payment.

#### ARTICLE 7—SUB-CONTRACTORS AND MATERIAL DEALERS

Sec. 1. To knowingly mislead through trade customs or terms, as to the real cost or quality of work or materials.

#### ARTICLE 8—LABOR

Sec. 1. To restrict the quantity or quality of the output of the individual.

Sec. 2. To increase cost through arbitrary rules as to number of workmen employed or use of plant and equipment.

Sec. 3. To deny to any man the opportunity to learn and, when qualified, to practice a trade.

Sec. 4. To abandon the work pending the decision of disputes between trades.

## How to Avoid Plaster Troubles

THE observance of definite directions in the use of gypsum cement plasters, wood fiber plasters and finishes is very important in securing first-class results and in making the mechanic's work easy. The directions from which this article has been prepared were furnished by the United States Gypsum Company, 205 West Monroe Street, Chicago, Ill. It is claimed that following these directions is just as important as following the specifications. The directions are divided into eight simple, common-sense rules, making it possible to readily avoid trouble and get the best results from plaster.

It is very important that moisture be kept away from plaster before mixing, as moisture causes plaster to partially set. Store plaster in a dry place and prevent the circulation of air throughout the warehouse as much as possible. The plaster should not be piled out of doors or on the bare ground or next to green walls, nor should it be allowed to stand dry mixed with sand.

The importance of proper lath conditions cannot be exaggerated. The lath should be of good grade and properly spaced and nailed. It is important that the lath should not be dry, as wood lath is bound to swell when wet, and if not swelled before plastering, it is likely to swell and buckle afterwards. It is better to wet the lath the day before, and again about an hour before plastering. It is especially important to wet wood lath over doors and windows, where the walls dry out very rapidly. Brick walls have a great suction and should be well sprinkled before plastering.

It is essential that clean water be used in all plastering work. Do not use stagnant water, but take water from wells or hydrants. Water from a barrel in which plasterers' tools are washed should never be used.

Only clean, sharp sand free from dirt, quicksand and frost should be used.

Plaster which has once set up should be kept out of the mix, as it causes quick-set. The

mortar box and tools should be cleaned after each gaging. Never wash the tools in the gaging water, nor mix one gaging with another. Plaster should not be retempered after it has begun to set. It is better to throw it away, and save time and money.

Mortar should be applied immediately after mixing, and great care should be taken never to mix more material than can be handled in about one hour.

It is very important that green walls be kept from freezing for at least twenty-four hours. After this length of time cold cannot injure them, but it is well to be sure that the frost is out of the base coat before applying the finish.

Plastered walls should be kept from drying out until set. This last rule is the most important, because dry-outs are the most frequent of all plaster troubles during the hot summer months. They appear as soft, chalky places on the wall. Dry-outs can be cured, but it is very much easier and cheaper to prevent them.

#### How to Prevent Dry-outs

One of the best methods for preventing summer dry-outs is to screen all the openings with cloth, or by other means to prevent blasts of hot air from drying up the water in the plaster. After the plaster has set, windows and doors should be opened to allow free circulation of air to dry out the moisture expelled from the plaster. In damp or rainy seasons artificial means of drying out the rooms after the plaster has set should be provided.

Wood lath is very thirsty in hot, dry weather and requires a lot of water. If this thirst is not quenched beforehand, the lath will dry up the water that belongs to the gypsum, and soft, chalky spots or dry-outs will result; therefore it is absolutely necessary to wet every portion of the lath. This should be done the night before plastering, if convenient, or at least four hours before plastering. Then sprinkle it again about one hour before the plaster is applied.

If plaster is applied too thin, the dry lath



will absorb the water from the small body of mortar and again the same trouble with dry-outs may occur.

#### How to Remedy Dry-outs

There is no need of particular alarm if the plaster does not set up on schedule time. Should it show signs of drying out before setting, the walls should be sprayed with clean water from a spray pump or a garden hose with a spray nozzle. When there are only a few dry-out spots, the water may be whipped in repeatedly

from a plasterer's brush. Do not become discouraged if the spots do not disappear at once, for gypsum plaster is sure to set eventually if kept wet. Keep on spraying, and the walls will set up sound and hard.

Pure water is the best treatment for dry-outs, but when quick action is absolutely necessary, it may be had by applying a solution of six ounces of pulverized commercial sulphate of zinc and twelve quarts of water with a spray pump or plasterer's brush to the dried-out portion of the wall.

## Clam-Shell Grab-Buckets

**A** GRAB-BUCKET that is heavy and powerful enough for the hardest digging and yet capable of rehandling light materials rapidly, is the combination which the Mead-Morrison Manufacturing Company, East Boston, Mass., claims to have put out in its type W grab-bucket. For digging in clay, rip-rap, gravel banks or any hard material, the bucket is reeved for a four-part closing purchase. Simply by changing the end of the closing line to a second clamp, a five-minute job, the bucket closes on a three-part purchase, making it faster in operation and suitable for rehandling sand, gravel or similar materials.

Another distinctive feature found in this bucket is the cast steel hinges, which have wood-lined bumpers to control the opening. In addition, there are cast steel stiffeners across the back of each shell, and heavy plate steel jaws which extend up the outside to the top of the shell. These hinges, stiffeners and jaws reinforce and add so much to the shell that they stay in shape after considerable abuse.

The heavy top yoke of cast steel, the peculiar reeving and arrangement of the closing drop and the off-center pull are claimed to give this grab-bucket a greater closing purchase than has any other similar bucket on the market.

The cast steel lever arm is so balanced that the bucket opens and discharges its load quickly, this being still further assisted by the shape of the shell. All parts of the bucket are steel; all wearing points are bronzed or metalline bushed. Teeth which are of especial value when digging in hard-packed or stick material are furnished as an extra.

Another feature of this grab-bucket is its removable shell, which is bolted, not riveted, to the superstructure. When the shells or jaws are



**THIS GRAB-BUCKET HAS A REMOVABLE SHELL TO FACILITATE REPAIRS**

worn or bent, they may be removed on the job, repaired or replaced. This does away with the necessity of sending the bucket away for repairs and keeps it continually in operation, also reducing the cost of transportation and labor necessary when the slightest repair means shipment to the factory.

### Figure Right and Keep Out of Trouble

Comparatively speaking, it takes much less energy and effort to *keep* out of trouble than it does to *get* out of trouble after you once get into it. Moral: Don't attempt to figure, within a few hours, a bid on a contract which you may be several years in executing. Remember, too, that when you sign a contract your obligations are generally set forth in hundreds of pages while the other side's obligations are covered by a comparatively few clauses.—Henry H. Wilson.

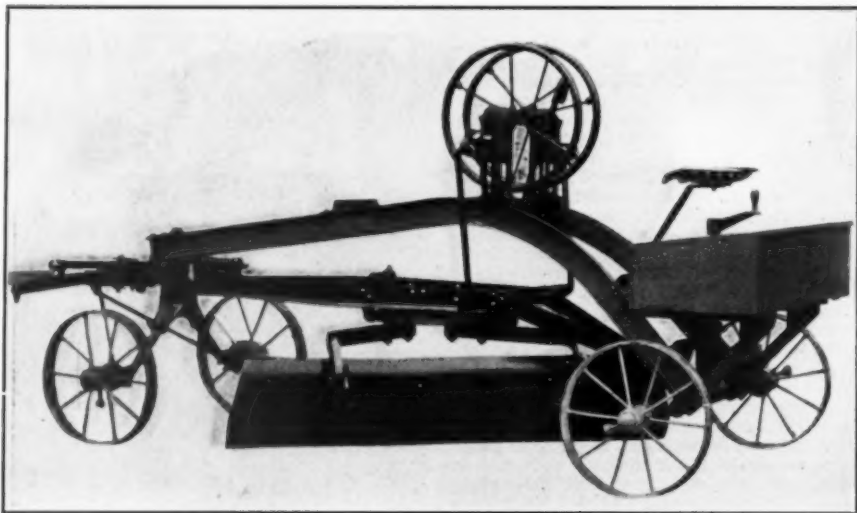
## A Steel Reversible Road Machine for Highway Patrol

**A** GOOD dirt road is not the result of any secret process or mysterious influence. Good dirt highways can be secured in almost any community in one way, and in one way only—with careful, judicious, consistent maintenance. Such maintenance means the use of the right kind of machinery at the right time, with intelligence.

The present-day tendency in maintaining dirt roads is toward the light road grader. This is not primarily because it will do better work than

tipping when the blade is moving earth. The front wheels are 22 inches and the rear wheels 30 inches in diameter.

The adjustments of the grader are simple, but quick and positive. They are easily made by the operator without changing his position. The blade is raised and lowered by means of hand wheels operating with a worm-and-gear mechanism. By releasing a bolt held in place with a spring, the blade can be reversed to any angle or all the way around. The blade when set to



A LIGHT-WEIGHT GRADER FOR ROAD MAINTENANCE

the heavier machine, but because it is more convenient and can be handled more economically. The light road grader can be drawn by two horses or a light tractor and can be handled by one man. The operating expense is therefore small, a factor of vital importance.

Having studied the situation carefully, the Good Roads Machinery Company, Kennett Square, Pa., has developed and offers the Winner Highway Patrol for dirt road maintenance. This machine is built along the lines of the heavier Winner graders, which have proved successful throughout their many years of service. The new highway patrol is built almost entirely of steel and malleable iron, with all parts interchangeable. The wheels, which are of steel, are of the concave type, preventing

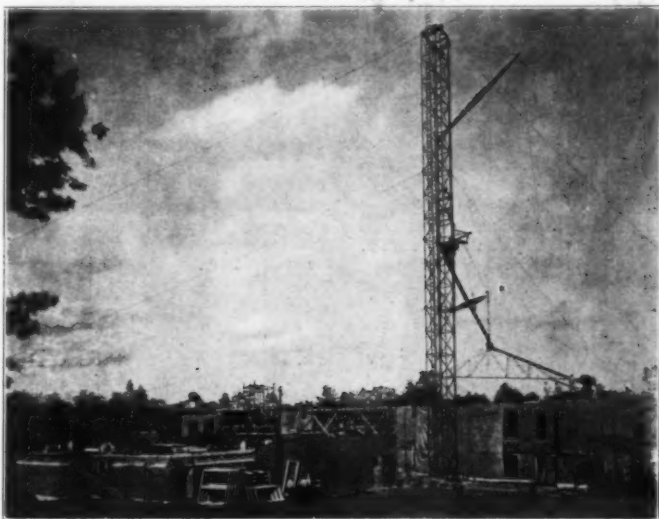
an angle of 45 degrees can be shifted laterally 2 feet outside the wheels. This lateral shift is controlled by means of a screw and bevel gearing. By removing three bolts the blade can be inclined backward and forward to suit the varying conditions of the soil.

One man sitting on the seat at the rear drives the team and operates the machine. If he does not care to sit, a comfortable platform is provided to stand on. A stand between the hand wheels is provided to which the lines can be fastened when the operator desires to have both hands free for other work. One team draws the machine in any kind of work—plowing, cutting down banks, removing earth or filling depressions. Thus, with one man and one team, the operating cost is maintained at a minimum.

## Steel Towers and Chutes in Concrete Building Construction

**I**T is doubtful if anyone who ever mixed and placed concrete, did not at some time take advantage of the fact that concrete flows through a chute at slight incline. That quality of concrete is so firmly fixed in the minds of all who have used it that concrete as a building material, and chutes as a method of handling it, are almost inseparable in thought. Today it is the usual thing for every contractor who is called upon to place any amount of concrete, to do it with chutes. Since the time when concrete was first placed with chutes, there have been great developments in its use, and corresponding developments in plant and equipment.

The modern concrete-placing plant made by the Insley Manufacturing Company, Indianapolis, Ind., consists of a number of separate units. The steel tower is made of standard sections and can be erected to any height desired, by adding to or decreasing their number. The front of these towers is so constructed as to furnish a track for a sliding frame. The hopper and boom connections are made on the sliding frame instead of the tower, and in this way the entire chuting plant can be raised or lowered at will. The boom supports the lower end of the boom chute, and the counterweight chute. Both these chutes are pivoted, so that a working radius of



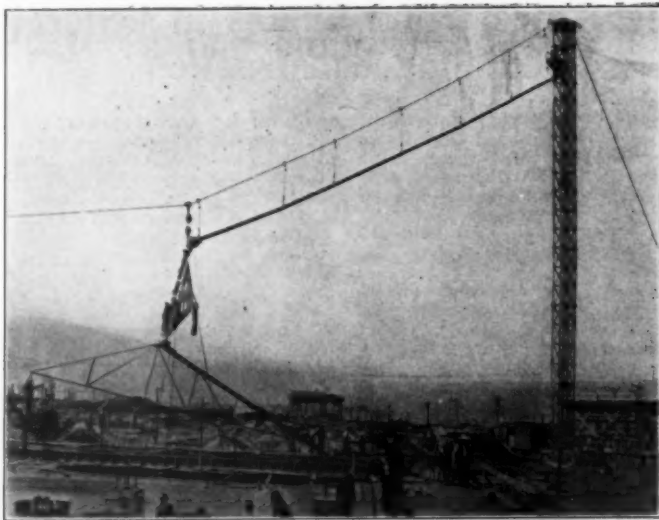
STEEL TOWER WITH BOOM AND COUNTERBALANCED CHUTES FOR DISTRIBUTING CONCRETE

In former times a set of troughs or spouts on a makeshift wooden tower sufficed, but now that concrete is produced on a quantity basis, an efficient mechanical plant is required. This need is met by the steel tower boom and counterweight plants of to-day.

While it is not, perhaps, advisable to chute every concrete operation in its entirety, it can be said that there are few operations of any size upon which the use of chutes will not lessen the placing-cost per yard and increase the efficiency. Because of the first cost of high-class equipment, however, it is generally thought inadvisable to install a new plant for anything less than a 3,000-cubic-yard operation. This works both ways, and circumstances sometimes make it unwise to use chutes on much larger jobs.

100 feet of chutes with no floor supports is obtained. This makes a very up-to-date plant for handling large quantities of concrete economically and efficiently.

The advantages of these various units are many. The steel tower is coming to be recognized as a permanent piece of equipment. It is nearly perfect in design and operation, and replaces with mathematical certainty doubtful features of a wooden tower. The sliding frame is of value on operations where there are several different pouring levels. This eliminates stopping the plant for more than half an hour to make one of these changes—work that could not be accomplished in less than a day in any other way. With the jobs scheduled on the basis of a floor every six or seven days, the advantage of the sliding frame can be readily



THE RANGE OF THE COUNTERBALANCED CHUTE IS EXTENDED BY USING THE CABLE TO SUSPEND THE CHUTE FROM THE TOWER

seen. The combination of the boom and counterweight chutes makes it possible for two men to move these chutes as rapidly as they can walk.

#### Less Labor Required

The gang required to operate this plant is much smaller than that required by any other method of placing concrete. Let us take, for example, a typical 8,000-cubic-yard flat-slab job, on which equipment of this type was used. The gang required was as follows:

- 1 foreman
- 1 hoisting engineer
- 1 mixer engineer
- 1 laborer on sand
- 1 laborer on gravel
- 2 laborers on cement
- 1 laborer at hopper
- 1 mixer operator
- 1 mixer operator helper
- 2 laborers spreading
- 2 chute handlers

The average output of this plant was about 300 yards a day. This gave a mixing and placing cost of from 40 to 60 cents per cubic yard, depending on type of work and wages.

The description deals only with a simple steel tower plant as used on a large variety of

operations. Frequently conditions arise which require special study. It is usually possible to plan an efficient plant. It sometimes involves the use of cable-suspended chutes, and frequently counterweight chutes, either suspended from the same cable or mounted on a derrick. For mass concrete over a large area, the arrangement of counterweight chutes on a derrick is a comparatively recent and highly efficient plant. This plant is supplied by a tower on one side of the work, and a line of chutes. This in turn distributes the concrete over a 150- to 200-foot radius with a full-circle swing. The chutes, of course, are self-supported.

Another modification of the steel tower plant is that type using considerable continuous line chuting suspended from a cable. Frequently a system of counterweight chutes is used as a means of distribution at the end of the continuous line chutes, and is suspended from the same cable. This type of plant is especially adaptable for large dams and bridges. The illustrations show these types of plant in use. They are both more or less special, but indicate the scope and development of present-day concrete-placing plants.

### The Shortest Code of Ethics

CONTRACTORS of a generation ago had the world's shortest code of ethics, according to Daniel A. Garber, who told the Associated Pennsylvania Highway Contractors that the old code was summed up in just two words: "Be slick." To-day, contractors have

a new conception of their responsibilities to employer and public, but they still can claim the record for brevity in their ethical code, which Mr. Garber says has been amended to read: "Don't be slick."—*Engineering News-Record*.

## Tunnel Mucking by Hand and by Machine

**W**IDE interest is being shown in mechanical mucking of tunnels as a labor-saving method and a way to speed up work. The shoveling machine made by the Myers-Whaley Company, Knoxville, Tenn., is being used on some of the largest tunnel projects in the country.

This machine consists of an automatic shovel, mounted upon the forward end of a swing jib, which is pivoted at its rear end to the main frame of the machine. This jib section carries an armored belt conveyor, which receives the material from the automatic shovel and delivers it to a second armored belt conveyor, mounted upon a rear conveyor, which is also pivoted for lateral movement at the same point upon the main frame. The truck wheels carrying the machine are driven by a reversing clutch and worm and chain drive, so that the machine can be moved forward and backward at the will of the operator. The operator is seated on a platform at the right-hand side of the jib section, so that he can see the shovel and guide it to its work. There are only two levers used in the operation of the machine. By one of these the operator moves the entire machine forward and backward; by the other one he swings the jib section.

These two movements give complete control and enable him to direct the shovel just as a man would direct a hand shovel. The lateral adjustment of the rear conveyor enables the machine to load either directly behind it or into cars standing on parallel tracks.

The entire machine is driven by one motor of 20 horse-power, mounted upon the main frame. All working parts of the machine are well protected from the material being handled. The gears are cut steel, hardened, and are operated in oil-tight cases, and the chains driving the shovel shaft are also mounted in oil cases. The use of steel castings and forgings permits the embodiment of great power and durability in a machine of moderate weight which can be handled easily over the ordinary mine tracks. The entire machine weighs about 18,500 pounds in working order, and experience shows that a 25- to 30-pound rail is entirely satisfactory. By means of the propelling mechanism, the machine is moved from one working place to another under its own power expeditiously and easily. The capacity of the machine averages about one ton per minute under ordinary conditions, and in very heavy iron ore the machine has loaded a maximum of over two tons per minute. The



**MACHINE MUCKING REDUCES LABOR COSTS IN THE SHANDAKEN TUNNEL OF THE NEW YORK WATER-SUPPLY**



daily capacity, however, is dependent upon local conditions and facilities for removing the material from the machine.

As an example of the saving possible to effect in some instances by use of these machines, we give below an actual comparison of speed and cost of tunnel mucking in the same heading before and after the installation of a Myers-Whaley machine:

#### HAND MUCKING PER SHOT

Time—19 to 21 hours	
Cost—3 labor shifts consisting of:	
18 muckers @ \$5.00.....	\$90.00
3 muck bosses @ \$6.50.....	19.50
	<hr/> \$109.50

#### MACHINE MUCKING

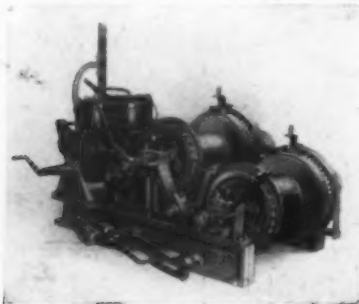
Time—3 to 5 hours	
Cost—1 crew:	
1 operator .....	\$ 7.00
2 men in front.....	10.00
2 men shifting cars.....	10.00
1 boss .....	6.00
	<hr/> \$33.00

Net saving in cost per shot, \$76.50  
 Net saving time of mucking, 16 hours  
 Tunnel section nearly round—11 feet 6 inches diameter  
 Holes drilled 13 feet deep  
 Shots pull 9 to 13 feet  
 Time required for drilling and shooting, 14 to 16 hours  
 Mucking is done while drilling is going on

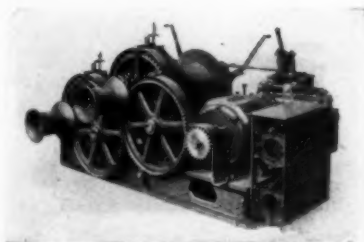
## A Standardized Line of Contractors' Stationary Hoists

A STANDARDIZED line of contractors' stationary hoists, two of which are illustrated herewith, has been brought out by the Pawling & Harnischfeger Company, Milwaukee, Wis. These hoists are made in types for electric, gasoline and belt-drive, in sizes ranging from 8 horse-power with an 8 x 12-inch drum up to 115 horse-power with an 18 x 28-inch drum. They are based on the long experience which this company has had in building its own hoist drums, electric motors, controllers and brakes used on its traveling cranes and monorail hoists.

The same quality of electrical apparatus furnished on their electric traveling cranes and hoists is used on all the new P & H electric-driven contractors' hoists. For the gasoline-driven hoists, motors of a type which has proved successful in the gasoline-driven cranes, trench excavators, gas shovels and drag-line excavators are used. These are in all cases of the heavy-duty, four-cylinder vertical tractor type with Bosch magneto, Master carburetors, Stewart vacuum systems and air cleaners. Automatic throttle governors are provided, and conveniently located hand throttles.



ONE TYPE OF STATIONARY HOIST



A SECOND TYPE OF HOIST FOR CONTRACTORS

The belt-driven types are similar, except that the rear end of the bed frame is left off and a larger-size driving pulley is provided on the side opposite the operator. The construction for all types is similar. The bed plates and side stands are of box and I-beam section design with heavy cross-girders and bottom and top flanging. Plates are accurately planed and side-faced. Through-bolts alone are used, and all holes are drilled in jigs and fixtures. All drum shafts are of high-grade carbon steel, turned and ground to exact size, giving a fully polished bearing for the drum bushings and side stands. Gears are made with cut teeth, and motor pinions and gears are hobbled. Drum gears are of solid web type with large hubs pressed in place on the shafts by hydraulic pressure against a shoulder.

The friction mechanism is of the standard V design. The friction blocks are of specially seasoned maple accurately turned. Brakes are operated by means of foot levers located convenient to the operator's feet. Full contact of the brake bands is insured because they are worked in on drums and peened to conform to the drum surface before placing on the hoist. This is done so that the user does not have to wear the brakes in. Counterweights are provided for all brakes, insuring a quick release.

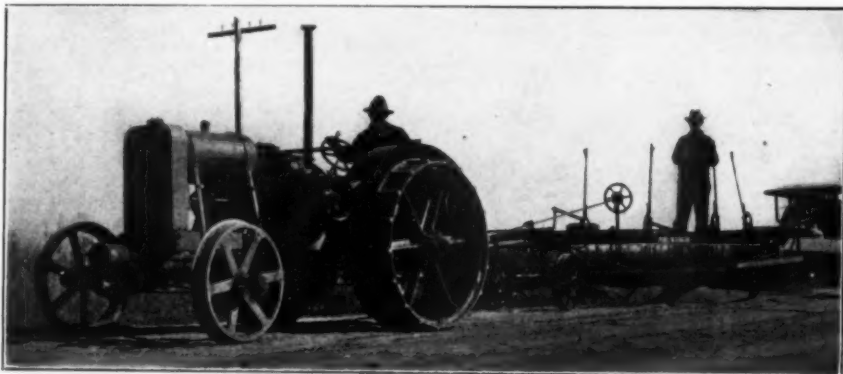
## The Tractor in Road Maintenance

**T**HE light tractor is recognized to-day as efficient and economical power for road maintenance work. The ordinary light tractor for agricultural purposes is not heavy enough to withstand the strain of road maintenance work. A road tractor should have abundant power, good traction, smooth riding qualities, rigidity of construction, fuel and oil economy, simplicity and accessibility for adjustments. The Hart-Parr Company, Charles City, Iowa, claims to have taken these factors into consideration in the building of the Hart-Parr "Special" road maintenance tractor, which has been built particularly to meet road maintenance requirements and has been found useful by state and municipal highway departments

was repeated until the outfit had traveled across the county, and the return was made in the same way.

This same rig also reshaped two miles of road near Mt. Lake, traveling 150 miles in doing that job. It also hauled cement culvert pipe, traveling a distance of 60 miles, and in hauling gravel and cement for the bridge crew, travelled approximately 250 miles, making a total of 1,757 miles travel in working for the county.

The load in hauling gravel was generally one 3-yard Buffalo-Pitts trailer, but if the road was good, they could and did haul two trailers. The biggest load they ever hauled was two of the trailers full of washed gravel with 25 sacks of cement on top. On one job the distance was



A HART-PARR SPECIAL ROAD TRACTOR OPERATING WITH A DUPLEX ROAD MAINTAINER

and contractors. This special road maintenance tractor is simple in construction, and all parts are readily accessible; thus the services of an expert engineer are not required to operate or care for it.

Interesting data regarding the use of a 15-30 Hart-Parr tractor on some work for Cottonwood County, Minn., have been furnished by D. R. Savage, District Engineer of the Minnesota Highway Department. This tractor, owned by A. M. Johnson, of Windom, Minn., hauled an Adams 12-foot grader for maintenance work and traveled 1,297 miles. In doing maintenance work they made one round, as with a road drag, and then put the blade square across the road and went the length of the road again. This

13 miles, making a round trip of 26 miles, which was covered in time for the man in charge to take his car and go home 6 miles farther to stay over night.

In precinct No. 4, Clay County, Texas, J. M. Donnell, Commissioner, states that they are hauling a 13½-foot blade road maintainer, covering one side of the road at a time in heavy dirt and pulling on high speed.

In Floyd County, Iowa, states G. H. Elliott, County Engineer, between July 15 and October 1 a county Hart-Parr "30" travelled about 805 miles, using 79½ gallons of gasoline, 989 gallons of kerosene, and 58½ gallons of lubricating oil, at a total cost of 18½ cents per mile for fuel and oil.

### Absentee Bossism

The new engineer had been on a visit to a building job in a distant city, and was giving his boss a full account.

"The foreman there," he said, "is disposed to take too much on himself. I told him he must get authority from here, instead of acting

so much on his own responsibility."

"Yes," said the boss, "so I understand. Here's a telegram from him: 'Last batch of quicklime boiling furiously in mortar box. Wire instructions.'"

## The Use, Care and Maintenance of Pneumatic Tools

THE contractor who is just beginning to use pneumatic equipment usually experiences a great amount of tool trouble. All large manufacturing plants have a pneumatic tool department to take care of the maintenance, oiling and repairing of such equipment, but in small plants and among contractors the foreman of the gang using pneumatic tools generally gives attention to such matters. Unfortunately, the care given pneumatic tools in use comes only after sad experience and sometimes a considerable expenditure of money.

The Dayton Pneumatic Tool Company, Dayton, Ohio, has issued some interesting material, from which the following article is prepared, to

acquaint new users of pneumatic equipment with the pitfalls which can be avoided by following the proper instructions. After the decision that pneumatic equipment is necessary, the first installation must necessarily be that of a compressor. In purchasing it is well to secure one of standard make, one with a reputation, and one with a service station comparatively near at hand. There are several very good makes on the market. In purchasing a compressor be sure it is of sufficient capacity to allow for expansion in the use of pneumatic equipment.

The next point to be considered is pipe for the plant. The best grade of black iron pipe should be used, as it is cheapest in the long run. Install it so that it will be accessible at all points. Whenever taking air from the main feed line, make the connection from the top of the feed line pipe instead of from the bottom, as by this method considerable condensed moisture is avoided.

Before using pipe it is best to steam it out thoroughly. This should be done three or four times. It is also well to go the length of pipe, striking frequent blows with a hammer to loosen all scale. In all new pipe there is scale, and unless properly cleaned out it may cause considerable trouble in pneumatic equipment.

The following "Ten Do's" and "Ten Don'ts" should be followed most carefully by the user of pneumatic tool equipment:

### TEN DO'S

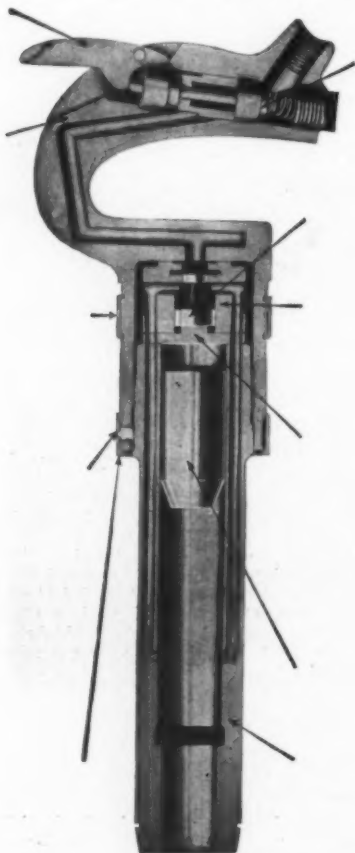
1. Keep the tool well lubricated.
2. See that the air hose is clean before connecting the hammer.
3. See that the air line is free from water.
4. Keep handle tight.
5. Be sure that parts are clean when reassembling.
6. Be sure locking pin is in proper hole.
7. Use bushing to handle; it is cheaper to buy bushings than handles.
8. Place competent man in charge of your pneumatic department.
9. Use good quality of hose.
10. Take care of tools when not in use.

### TEN DON'TS

1. Don't operate an inefficient tool.
2. Don't use a cheap grade of oil.
3. Don't use chisels or rivet sets with rough shanks; they cause excessive wear on the nozzle or bushing.
4. Don't forget to oil the hammer.
5. Don't let the hammer lie around and rust.
6. Don't look into the hammer with the air turned on. The piston may be shot out and do great damage.
7. Don't forget to lubricate.
8. Don't let the operators grind their own pistons.
9. Don't forget to clean the parts before reassembling.
10. Don't forget to see that the handle is tight.

### Care and Maintenance

Too much emphasis cannot be laid on the necessity for proper care of all types of pneumatic tools. It is really surprising the number



SECTIONAL VIEW OF THE NEW DAYTON  
LIGHT RIVETER

of companies that will go to the expense and trouble of making exhaustive tests to aid them in the intelligent selection of pneumatic tool equipment and then overlook the necessity of issuing proper instructions on the care and lubrication of this equipment, not only to safeguard the investment represented, but also to forestall the inconvenience and loss of production that will surely follow such neglect.

On account of close fits in the valve mechanism of all types of modern air tools and the high state of efficiency to which they have been developed, it is essential that two important rules be followed if this equipment is to be maintained at its highest efficiency:

First, be sure that the air line is clear and free from dirt and water before attaching it to the tool. This can be done by blowing out the line before making the attachment.

Second, be sure that the tool has been thoroughly lubricated before starting, and if it is in continuous service add oil at least every hour. In intermittent service, oil should be applied at least twice a day.

After each day's use the tools should be im-

mediately flushed with kerosene to remove any gummy oil or moisture that may have accumulated, after which they should be generously oiled before being laid away.

Lubrication can easily be accomplished by injecting the oil through the hose line connection, at the same time holding the throttle valve open to allow the oil to pass to the functioning parts. A mineral oil of light body should be used at all times, and it is well to remember that you cannot injure the tool by using too much, but can quickly ruin it by using too little.

At the end of each day's operation it is well to inspect the packing gland at the lower end of the rammer cylinders. The packing at this point should be kept tight enough to prevent air leakage if consistent performance is to be maintained.

Large users of pneumatic tool equipment have found it to be poor economy to use a chipping hammer having a badly worn chisel bushing, or a riveting hammer with a badly worn rivet set bore. Excessive breakage of chisel and rivet set shanks is in most cases directly traceable to this.

## A Gasoline Hoist for Lumber Handling



A NOVO HOIST USED BY A NEW ORLEANS LUMBER COMPANY

**T**HE handling of heavy lumber on construction jobs in lumber-yards and elsewhere by man-power is not only unsafe but uneconomical. An interesting case of the use of a Novo hoist rigged up with a derrick to handle 12 x 12 timbers is illustrated above.

The Delta Lumber Company of New Orleans, La., purchased a Novo 6-horse-power type C

hoist, and made up the double line rig as shown. This hoist picks up the 12 x 12-inch timbers, 30 feet long, and handles them with perfect ease and safety. The engine was sold to the Delta Lumber Company by the Menge Pump & Machinery Company, Ltd., 862 Tchoupitoulas Street, New Orleans, La.

## Painting Roofs and Smoke-Stacks

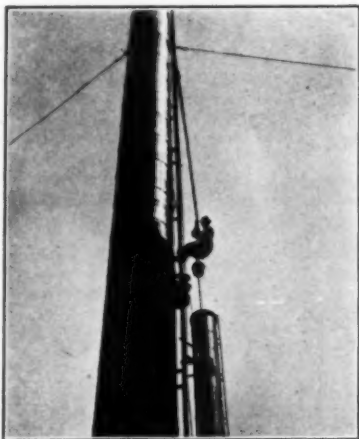
**T**HE painting of roofs requires a paint with especially strong protective qualities where the best service is desired. The roof is directly exposed to the action of elements which tend to destroy paint, namely, the heat of the sun, storms of rain, hail and snow, the wearing action of dust and dirt, moisture, gases and acids, all combining to produce corrosion and wear. In order that the roof may properly protect the structure, it is necessary for the roof in turn to be properly protected. The most economical paint is the one that will put off repainting for the longest period, while protecting the metal or wood from deterioration. Labor for repainting is far more costly than the slightly higher price asked for the best grades of protective paint.

The silica-graphite paint made by the Joseph Dixon Crucible Company, Jersey City, N. J., is claimed to give the longest protection at the lowest yearly cost. This paint when applied to roofs gives exceptional protective service. It is formed of a practically inert pigment and a pure boiled linseed oil vehicle. It must be applied in a sufficient number of good, even coatings of proper thickness. Three coats are recommended for new metal ware and two coats for metal previously painted. This paint is suitable for canvas roofs, but is not intended for rubber, paraffine or tar roofing, as linseed oil paint will not adhere to these substances. When silicate graphite paint is applied to a new galvanized iron or tin roof, the roofing should first be washed clean of oil, etc., with a solution of sal soda, commonly known as washing soda. Then when the roof is dry, the first coat of Dixon's dark, a second coat of natural color, and a third coat of Dixon's dark red should be applied.

Where shingle roofing is dry, the shingles should receive a coat of oil, otherwise the shingles will quickly absorb the oil from the paint, leaving the pigment without sufficient binding material. The shingles should really be dipped in oil before painting, and good protection has been secured by painting the under part of the shingles before laying. Shingle roofing has been painted with dark red or olive green for beautifying effect and with natural color for slate effect and has given many years of service on this class of work.

The estimated covering power for metal surfaces is 500 square feet to the gallon for the first coat and 550 square feet for the second coat. For wood surfaces, 250 square feet to the gallon is the estimate, owing to the absorption of the oil by the wood.

The service demanded of smoke-stack paint is in some respects very severe. The two most



PAINTING A TALL METAL STACK

destructive elements usually encountered are the excessive heat and the sulphurous gases that escape from the stack. Dixon's silica graphite paint, being a natural union of silica and flake graphite, is claimed to be able to successfully withstand heat, sulphurous gases, and atmospheric conditions. It is practically inert and therefore does not combine chemically with the oil, like many metallic pigments. The big item in any painting job is the labor, which costs about the same, regardless of the quality of the paint and its protective efficiency. In case of stack painting, the cost is increased because of the hazard, since painters are in danger of serious burns or falls. For heated surfaces, Dixon's black is recommended, as it is particularly adapted to such service. The silica graphite paint is not recommended where the heat runs over 500 degrees Fahrenheit, as no linseed oil paint, or, for that matter, any other form of oil paint, will give satisfactory results, for the oil vehicles will burn at a greater heat than that mentioned. Two coats of paint for smoke-stacks which have been previously painted, and three coats for new smoke-stacks, is the standard practice.

The stack should first be put in proper painting condition, as recommended by the manufacturer. The paint should be applied when the stack is cold. It should be allowed to dry thoroughly so that the oil oxidizes and is able to withstand the maximum degree of heat.

### Who Makes Guy and Stiff-Leg Derricks?

Frequently you are confronted with the question of who makes a specific kind of equipment. By consulting the "Where to Purchase" directory beginning on page 3 of the **CONTRACTORS' AND ENGINEERS' MONTHLY** your query is quickly answered.



## The Value and Use of Dump-Cars

**T**HE rapid development of the modern steam shovel to an efficiency undreamed of a few years ago, has brought about a corresponding development of the dump-car. Some method had to be provided for carrying away excavated material fast enough to keep the shovel moving. Otherwise the cost of operation would prove prohibitive. In full realization of the secret that successful shovel work lies in the rapid and economical handling of excavated material rather than in the excavation itself, the Western Wheeled Scraper Company, Aurora, Ill., developed the Western dump-car in increasingly larger loading units. In former years dump-cars were used in a very restricted way and only in small sizes, carrying usually from 1 to 3 or 4 cubic yards. Now 30-yard cars are often installed on heavy work.

In addition to its use in railroad construction, the same type of car is now employed in building levees, excavating ditches, stripping overburden from ore beds, handling slag, cinders, refuse, etc., about mines and steel plants, and in a hundred other ways by contractors and industrial plants.

The bed of the car is pivoted longitudinally in the center over the draft beams and will dump to either side. When dumping, the hinges, riveted to the center sill under the bed, rock on pedestal castings which are riveted to the draft beams. The connection consists of a flat bar which drops loosely into the socket of the pedestal, in a perpendicular position. The upper end of the bar is held between the lugs of the bed hinge by a pin. The weight of the car does not rest upon the horizontal pin which passes through the hinge, so there is no liability of bending the pin, as is the case with some other



GRADING WITH 1½-YARD DUMP-CARS HAULED BY MULES

makes of cars. This avoids difficulty in dumping the bed, caused by such bending.

The arms operating the doors operate automatically. When the bed of the car is tipped, the toggle holds the door from dropping with the bed. The door opens as the car is dumped, and closes as the bed is returned to an upright position, both automatically and instantly.

The door arms are pivoted where attached to the door and to the bed, in such a manner that as the bed is tilted, the door is thrust outward and upward from the load so that no part of the load as it moves is thrown against the door. This removes the tendency to derail the car by the impact. The device permits the load to be discharged immediately, as illustrated below. When the car is dumped, the door is brought to a position nearly parallel with the top of the bed. On account of the large opening for discharge and the acute dumping angle, almost anything that can be loaded into the cars will clear the sideboard in dumping, so that heavy rocks

and boulders or frozen earth in large masses can be easily handled. In dumping, the bed is not held rigidly to the draft beam, but is permitted to rise slightly from the pedestals at the moment of the shock, so that there is no tendency to lift the truck from the rails. The Western car is built as low as possible, consistent with maintaining a steep dumping angle. The dumping angle of cars up to 3-yard size is 47 degrees, and for larger sizes it is 45 degrees as measured on the tracks, though when dumping loads the compression of the springs brings the actual angle to 47 degrees.



WESTERN CARS DUMPING MATERIAL FOR SLUICING ON THE ENGLEWOOD DAM NEAR DAYTON, OHIO

The gage for the 1- and 1½-yard sizes is 24 inches; 2-yard, 30 inches; 3-, 4- and 5-yard and double truck 8-yard, 36 inches; 6-yard and larger (except 8-yard), 56½ inches. While these are

the standard, cars are made on any practicable gage, extra charge being made for special construction where particular conditions make odd gages necessary.

## Land Dredges for Road and Drainage Work

Extensive Use in the South Has Expedited Highway Work and Land Conservation

**I**N the South where new roads have been constructed requiring considerable drainage on account of low surrounding land, land dredges have been used to provide the proper drainage and construct the fill necessary for the road. Much of this work has been through soft land, which during the greater part of the year is covered with water. Machines have been put through heavy gumbo clay matted with cypress and gum stumps, which after being blasted are easily dug by land dredges made by the Bay City Dredge Works, Bay City, Mich. The nature of the ground was such that apparently no machine except a floating dredge could be put over the work. The ditches to be constructed, however, were too narrow for the use of a floating dredge, and consequently the walking

dredge has been practically the only type of machine which could successfully operate on this kind of work.

On several contracts of this kind in Arkansas and other states, Bay City walking dredges were used. Ditches were constructed on each side of the proposed road, the ditches having a bottom width averaging 4 feet, and a depth averaging from 6 to 7 feet. The excavated material was placed in the center of the road and rolled, and finally covered with stone.

The walking device incorporated in Bay City land dredges has been in use several years on dredges of heavy construction. In 1916, the Bay City Dredge Works redesigned this walking device to conform to its lighter steel construction, and since that time has placed in the field a



WALKING DREDGE WORKING ON ROAD JOB IN MISSISSIPPI COUNTY, ARKANSAS

number of this type of dredges. The walking dredge moves either forward or backward under its own power, with practically no lost time for moving, and can walk back on laterals or from one lateral to another at a fairly high rate of speed. The walking feature reduces the moving time and increases the monthly yardage.

The dredge will walk over rough, slippery or swampy ground and among close-cut stumps where other types of land excavators would find it difficult or practically impossible to work. This type of dredge can be handled by an operator and one helper, thus making the labor cost low. The dredges are built in  $\frac{1}{2}$ -,  $\frac{3}{4}$ -, 1- and  $1\frac{1}{2}$ -cubic-yard capacity, and in width from 14-foot span up, the span being figured as the distance between the inside of the feet. The walking dredges illustrated herewith are working on a road job in Mississippi County, Arkansas, for Voglesang Brothers, of Cape Girardeau, Mo. They leave clean, wide berms, and the excavated material can be placed on either or both banks well back so as to prevent washing into the ditch. This produces a good-appearing piece of work, and the wide berms make it easy to go over the ditch when clean-cut work becomes necessary.

### The Engineer's Pay

It takes a good engineer to help a community "get anywhere" with its transportation problems, and the public service he renders is generally out of proportion to the pay he receives.—*Highway News Digest.*



A CLEAN DITCH WITH WIDE BERMS  
BESIDE ROADWAY

## How Prepared-Roofing Makers Solved the Slack-Season Problem

**T**HOUGH comparatively new in business, manufacturers of asphalt roofing—shingles and rolls—are thoroughly familiar with the old problem of keeping their mills busy during the months of December, January and February. They have been among the many victims of seasonal peaks and depressions. But they have suffered more perhaps than the average manufacturers because theirs has been a fast-growing industry, and after the winter let-down in production it has been a terrific strain to meet the heavy spring demand.

How to distribute demand more evenly throughout the year seemed to be a more pressing problem last November than at any time in the last few years, for all signs pointed to unusual building activity beginning with the spring of 1922. What could be done to stimulate winter buying of roofing material?

The leading manufacturer in the industry—leader because of his ownership of patents covering a widely used asphalt strip shingle which some forty factories are making under license agreements—undertook to find the answer. His canvass of the industry showed that the usual

slump in orders was impending, and that no one was ready to suggest a stimulant.

### The Proposal

His proposal was simple, and in line with popular demand. It was to cut prices to the bone—cut them actually under cost of production—and give the greatest possible publicity to the action. He proposed to force dealers to stock up during the winter by convincing them that it would be profitable to buy with borrowed funds, if necessary, while quotations were at bed-rock.

To licensees, whose factory price of the strip shingle is controlled, this manufacturer proposed a cut from \$4.85 per "square" (enough material to cover 100 square feet) to \$4.25 on the strip shingle, and proportionate cuts in other prepared roofing products. The new prices would be 40 per cent lower than high quotations for 1920, and would be actually below pre-war, or 1913, figures if pre-war freight rates prevailed.

It was proposed to link with the announcement of price reductions the logical and popular argument that by maintaining a flow of orders

throughout the usual slack months, these results would follow:

First, factory organizations would be kept intact and tuned up for spring production.

Second, the manufacturers would assist materially in keeping down the volume of unemployment during the season when the jobless worker suffers most.

Third, tonnage would be kept moving on the railroads during an ordinary slack season.

Fourth, prices of other building materials would probably be lowered, and the expected stimulation of building would sooner take effect to relieve the housing situation.

It was further proposed to readjust prices, following the first radical cut in accordance with a schedule somewhat as follows:

At the rock-bottom quotations, sufficient orders would be taken to keep factories running at full time during December—and at an actual loss. After the first advance in prices, additional orders would be accepted for January out-turn—and on these, manufacturers would break even. With dealers encouraged to buy in anticipation of spring demand and inevitably higher spring prices, quotations would be moved up so that the February output (still at capacity) would show sufficient profit to more than offset the losses of December.

#### The Response

At any rate, this program was laid out by the executive heads of the manufacturing company which took the initiative; and it was generally adopted by the industry. On December 6, announcement of price reductions was made; and because it was live news, papers all over the country gave it prominent display.

A considerable number of prominent business men, bankers and Government officials were notified by telegram of the price reductions and the motives underlying the announcement; and many of them responded in characteristic telegrams and letters.

A telegram similar to that sent to Secretary

of Commerce Hoover was answered by Colonel Arthur Woods, who had been chosen by Hoover to be the working head of the President's Conference on Unemployment. Colonel Woods wired:

"The action of the roofing manufacturers is as practical and patriotic a step toward relieving



**TYPE OF PATENTED ASPHALT STRIP SHINGLE MANUFACTURED UNDER LICENSE BY SOME 10 MANUFACTURERS OF PREPARED ROOFING IN THE UNITED STATES AND CANADA**

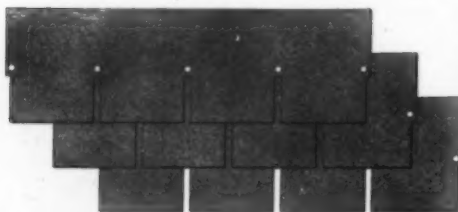
unemployment and starting up business right now as has come to the attention of the President's Conference on Unemployment up to this time. Similar action along other lines of industry would do a great deal toward providing work during the winter months, stimulate out-of-season activities and blot out the shadow of prospective bread lines and soup kitchens."

"Similar action on the part of other manufacturers," wired James B. Forgan, head of the First National Bank, Chicago, "would do much to diminish unemployment and consequent suffering during coming winter and thus also prevent growth of radicalism."

It was the expected that happened. Manufacturers of asphalt roofing generally fell into line with the reasoning of the leaders, and throughout the industry prices were cut, not only on the patented strip shingle, but on every other important line of asphalt roofing. Within forty-eight hours after the announcement of the reductions orders had poured into the factories in excess of the most optimistic predictions.

Manufacturers are running full time, and expect to carry on full-handed during the entire period of normally slack production. The first small increase in quotations failed to check the flow of orders; and the activity of the roofing plants has been reflected in abnormal winter production on felt mills and other producers of the raw materials of prepared roofing.

Best of all, a state of mind favorable to the immediate forwarding of residential building and roof repairing (rather than patching) has been created. Manufacturers in this industry are cordially recommending this courageous, surgeon-like cure for the winter depression which comes from decreasing output and dishearteningly continuous "overhead."



**PATENTED ASPHALT STRIP SHINGLE, SHOWING METHOD OF LAYING TO SECURE EFFECT OF INDIVIDUAL SHINGLES**

### The Engineer's Responsibility

The engineer in charge of the project is in the position of being paid by the owner, yet is expected to be impartial and see that the owner gets what he pays for and that the contractor is paid for what he does. He must have due regard for good business as well as engineering practice. He should be allowed latitude in his dealings with the contractor. Neither one should be placed in a straight-jacket.

## ASSOCIATED GENERAL CONTRACTORS

### NEWS NOTES AND COMMENTS

#### Resolution Upholds National Board for Jurisdictional Awards

THE Associated General Contractors of America, the American Institute of Architects, the Engineering Council, the National Building Trade Employers Association, and the Building Trades Department of the American Federation of Labor, through the National Board of Jurisdictional Awards have reached a national agreement and passed a resolution heavily penalizing men who refuse to abide by the decisions of the Board. The resolution provides that local building trade councils of union labor shall suspend unions and refuse to recognize or support those unions which refuse to abide by decisions of the National Board. It also provides that general contractors and subcontractors who employ only union labor shall incorporate in their agreements with labor a provision that will secure compliance with all decisions of the Board, and that they shall refuse employment to members of local unions which do not abide by such decisions, and, further, that architects and engineers shall insert in all their specifications and contracts a clause that such decisions shall be followed.

This resolution is of far-reaching consequence in settling those jurisdictional disputes which in the past have constituted the

majority of the causes for strikes and resulting delays and economic losses. It is the most effective cooperation between workmen, employers and professional men interested in construction, looking toward the settlement of these jurisdictional disputes

without resort to strikes. This action has been taken as a result of the report of a special committee of the National Board appointed to outline the procedure to be followed in clearing up the situation created by the refusal of the United Brotherhood of Carpenters and Joiners to conform to the decisions of the Board in the case of settling the dispute between the carpenters and the sheet metal workers, which was decided in favor of the latter. This dispute involves the setting of sheet metal trim on doors and windows. The carpenters have refused to abide by

decisions and

have called strikes

and suspended work on big construction jobs in many parts of the country, causing serious trouble and unemployment in other trades.

Of the seventeen international unions that constitute the Building Trades Department of the American Federation of Labor, sixteen have unqualifiedly endorsed the work of the Board and supported its decisions. The carpenters' union alone, although one of

#### Who Is a Contractor?

There is no class of work that takes as varying qualities or so many qualities as contracting. It appeals to men who are optimistic and to those who have born in them the longing for doing things. The contractor must be a man first, and possess that most uncommon thing, common sense; and he must have physical sense, the sense that tells a man without calculating where lies the center of gravity; the sense that tells a man values without estimating; the sense that tells a man quantities without measuring. He must have magnetism in order to gather his men about him. He must have a reputation for justice in order to hold them. He must be forceful in order to inspire energy in others. He must be a lawyer and buyer. He must have the ingenuity of the inventor and the grasp of the field marshal. He must be a diplomat and he must be a politician. He must also know when not to be a politician. He must be a financier, and, I regret to say, in these days an advertiser; and he must be a prophet. And if he is worthy he is a member of the A. G. C.

—THOMAS BENTLEY,  
A. Bentley and Sons Company,  
Toledo, Ohio.



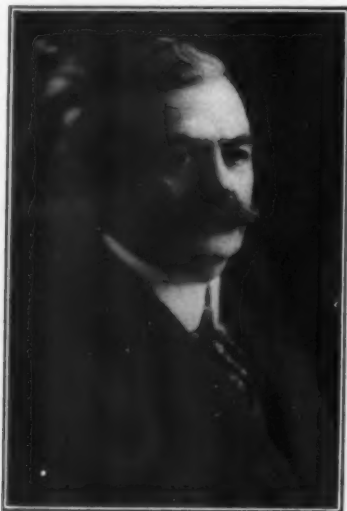
the original organizers of the Board, now refuses to support it. As a result, its members have been suspended from the Building Trades Department of the American Federation of Labor and have been outlawed by every building trade council and the leading organizations of general contractors, subcontractors, engineers and architects in the country.

The purpose of this National Board of Jurisdictional Awards is to settle difficulties between unions over what crafts shall do certain work in the construction industry, by orderly and judicial procedure rather than by costly strikes. The metal trim case above referred to was under consideration nearly a year, during which both sides were given ample opportunity to be heard. Fifty decisions of nation-wide scope have been rendered in the past two years, and these decisions have settled or averted over 200 strikes in 1921.

An important decision also finally settled at the recent meeting of the Board was that of the elevator constructors versus the electrical works as to which trade should have jurisdiction over the work of hoisting, lowering and placing elevator machinery. The work was awarded to the Elevator Constructors.

### A. G. C. Biographies

*Colonel John R. Wiggins, President, John*



COLONEL JOHN R. WIGGINS

R. Wiggins Company, Inc., Philadelphia, Pa., is a native of Philadelphia, where he started in business as a contractor in 1885. He has erected some of the largest buildings in Philadelphia and has always taken an active part in the construction industry as well as in politics, military affairs and social activities. He has represented the A. G. C. as a member of the National Board of Jurisdictional Awards in the Building Industry. He was active in the organization of the National Federation of Construction Industries and has been Vice-President since its inception. He is a member of many Philadelphia organizations and is President of the Chester Construction and Contracting Company, of Chester, Pa.



R. L. BURNEY

*R. L. Burney, Walsh & Burney, San Antonio, Texas, graduated from a Texas college in 1906 as a civil engineer. He then worked on the New York and Pennsylvania tunnels under Manhattan Island. His next move took him to South America, where he worked as assistant engineer on a railroad project on the Madera River for two years. Foreign work then attracted him to a Mexican coal mining company, of which he eventually became chief engineer. He quit only when a revolution closed the mine. In 1913 he joined Mr. Walsh and formed the firm of Walsh & Burney at San Antonio.*

# CURRENT CATALOGS

The catalogs and pamphlets listed below are available for free distribution. Contractors and Engineers who check over these pages each month and write for such material as interests them, will find this a valuable means of keeping up to date on the subject of machinery and equipment.

## CONCRETE MIXERS WITH LOW UP-KEEP

Literature describing Smith concrete mixers, which give consistent day-in and day-out performance with low up-keep, may be secured from the T. L. Smith Co., 1014 32d St., Milwaukee, Wis.

## EXPANSION JOINTS FOR ROADS AND WALKS

The Serviced Products Co., First National Bank Bldg., Chicago, Ill., will send samples and prices of its various types of expansion joints for concrete roads, granite, brick, and wood block paving, and sidewalks, to interested contractors.

## ROAD-PAVING ASPHALT

The Standard Oil Co. of Indiana, 910 South Michigan Ave., Chicago, Ill., has prepared a booklet, "Stanolind Paving Asphalt," containing information regarding asphaltic roads.

## GETTING RESULTS ON ROAD JOBS

In a well-illustrated, 32-page booklet entitled "Results on Road Jobs," the Barber-Greene Co., Aurora, Ill., describes many new applications of B-G loaders on all kinds of road work.

## A SUBSTANTIAL TRENCH EXCAVATOR

In Bulletin X, The Excavating Machinery Div. of Pawling & Harnischfeger Co., 88-9 National Ave., Milwaukee, Wis., gives details regarding the P & H wheel-type trench excavator and its remarkable record.

## WATER METER BOXES

Catalog R, issued by the H. W. Clark Co., 130 South 17th St., Mattoon, Ill., describes in detail the Clark meter box for protecting water meters and making them readily accessible to meter readers.

## SELF-LOADING SCRAPPERS

Contractors having excavating and grading jobs in prospect may get full data regarding self-loading scrapers which have proved fine dirt movers, from the Baker Manufacturing Co., 503 Stamford Ave., Springfield, Ill.

## STOPPING WATER WASTE WITH METERS

Purchasing officials can secure much interesting and valuable information regarding the stopping of water waste with meters by writing to the Badger Meter Manufacturing Co., 191-847 Thirteenth St., Milwaukee, Wis.

## CLEANING WATER-MAINS

Officials interested in maintaining a water-distributing system at a maximum of efficiency should secure the literature of the National Water Main Cleaning Co., Hudson Terminal Bldg., New York City, which tells how many cities are keeping their water-mains clean and equal to the original carrying capacity.

## TRACING WATER-MAIN LEAKS

The Pitometer survey method of tracing leaks in water-mains and checking illegal use of water and locating broken services is described in the literature of the Pitometer Co., 52 Church St., New York City.

## WELL-DRILLING MACHINES

In an illustrated catalog J the Leidecker Tool Co., Marietta, O., gives full details regarding Leidecker well-drilling machines, drilling and fishing tools and elevators.

## HIGHWAY BUILDING WITH MOTOR TRUCKS

The Autocar Co., Ardmore, Pa., has just issued an interesting 16-page booklet telling how 1000 miles of new highways were built during 1921 with autocar motor trucks and illustrating a number of the jobs and types of trucks used.

## A NEW CONCRETE MIXER

The Foote Concrete Machinery Co., 1241 S. Michigan Ave., Chicago, Ill., will send literature to any contractor or official interested, describing its new "Multi-Foote" concrete mixer.

## LOW-CHARGING CONCRETE MIXERS

Building contractors interested in a full-capacity, fast-mixing concrete mixer of heavy construction, featuring a low-charging loader skip, may secure full information by writing to the Oshkosh Mfg. Co., Oshkosh, Wis., and asking for a copy of its low-charging mixer catalog.

## A POLISHED SHOVEL IS A BLACK SHOVEL SPOILED

The whys and wherefores of this statement and full information regarding the advantages of Pittsburgh shovels will be found in literature which may be secured from C. B. Steffy, Secretary, Pittsburgh Shovel Co., Pittsburgh, Pa.

## CONCRETE ROAD BUILDER, TAMPER AND FINISHER

A new "Mile-a-Week" road builder for screeding, tamping and finishing concrete roads and base courses is described in detail in the literature of the Dunn Road Machinery Co., Conneaut, Ohio.

## A NEW MODEL AUTO CRANE

In Circular 1035 CE, the Byers Machine Co., 480 Sycamore St., Ravenna, Ohio, describes in detail its new Model 4 auto crane with caterpillar traction.

## WIRE ROPE

In Bulletin S-110, The Bucyrus Co., South Milwaukee, Wis., describes in detail its wire rope especially designed and made for excavating machinery and contractors' service.

## WATER-METER BOXES AND SETTINGS

In the literature of the Ford Meter Box Co., 406 S. Carroll St., Wabash, Ind., officials and purchasing agents will find complete data regarding meter boxes and devices for basement meter settings, as well as other water-works accessories.

## RADIAL BRICK CHIMNEYS

The American Chimney Corp. of New York, 147 Fourth Ave., New York City, has issued a catalog on radial brick chimneys, which it will send free on request to any contractor or builder.

## WATER STERILIZATION OUTFITS

The literature of Wallace & Tiernan, Inc., Newark, N. J., describes in detail chlorine control outfits of both portable and permanent types for the sterilization of water-supplies, both large and small.

## CEMENT FOR EASTERN CONTRACTORS

Eastern contractors having concrete work in view may secure prices on genuine Pennsylvania cement from the Pennsylvania Cement Co., New York City.

## ASPHALT FOR ROAD WORK

Asphalt prepared for any specification will be quoted for contractors and city officials by the Pioneer Asphalt Co., Lawrenceville, Ill.

**PNEUMATIC TOOLS FOR BUSHING CONCRETE**  
Contractors engaged in special concrete work which requires bushing or facing of concrete façades or walls may be interested in Bulletin 1043 CE, which may be secured from Thos. H. Dallett Co., Philadelphia, Pa., describing its pneumatic scaling tools and scaling equipment.

**PROMPT SEWER PIPE DELIVERIES**

The Delaware Clay Products Co., 807 Westinghouse Bldg., Philadelphia, Pa., will be glad to quote prices on all sizes of standard and double-strength vitrified pipe from 3 to 36 inches in diameter and 2- to 3-foot lengths for prompt delivery.

**A PORTABLE 16-INCH BAND-SAW**

J. D. Wallace & Co., 1401-1417 West Jackson Blvd., Chicago, Ill., will send to any interested contractors copies of its descriptive bulletins covering the new Wallace 16-inch band-saw, which can be operated on an electric lighting circuit.

**GASOLINE LOCOMOTIVES FOR ROAD WORK**

Bulletin 2211, published by the Geo. D. Whitcomb Co., Rochelle, Ill., contains many facts and illustrations regarding the use of Whitcomb gasoline locomotives by contractors in road building.

**NESTED CORRUGATED METAL CULVERTS**

In a 48-page catalog, the Canton Culvert and Silo Co., Canton, Ohio, describes in detail for the benefit of contractors and highway engineers its complete line of Acme nested corrugated culverts for highway and drainage work.

**COMPLETE AUTOMATIC BLUEPRINTING MACHINE**

Contractors interested in reducing the cost of their blue-prints may secure full information regarding an automatic blueprinting, washing and drying machine, which cuts blueprinting costs, from the C. F. Pease Co., 813-821 North Franklin St., Chicago, Ill.

**A UNIVERSAL DUMP BODY FOR TRUCKS**

The Eagle Wagon Works, Auburn, N. Y., has just issued a new circular describing in detail its Eagle Universal dump body for Ford one-ton trucks, which will be of interest to contractors in road and other types of light hauling work.

**SALE OF CONTRACTORS' USED EQUIPMENT**

Contractors wishing to purchase used equipment in the open market will do well to get in touch with Philip T. King, 30 Church St., New York City, and secure his listing of used equipment for sale.

**NEW AND USED EQUIPMENT FOR CONTRACTORS**

The Peerless Iron & Metal Co., 552 Penobscot Bldg., Detroit, Mich., will be glad to send complete information regarding its new and used equipment for contractors, which it has for sale and immediate shipment.

**SAND- AND GRAVEL-PRODUCING EQUIPMENT**

Catalog No. 5A, recently issued by the Good Roads Machinery Co., Kennett Square, Pa., contains 60 pages of illustrated material covering all types of equipment for the production of washed sand and gravel.

**STONE SPREADERS FOR ROAD WORK**

Full information on the value of Burch stone spreaders, which, when attached to motor dump trucks, spread an even layer of stone or gravel over the road, may be secured from the Burch Plow Works Co., 102 Bucyrus St., Crestline, Ohio.

**METAL LATH FOR BUILDING CONSTRUCTION**

Interesting literature describing Steelcrete "Rid-Gid" metal lath may be secured by contractors by writing to the Consolidated Expanded Metal Companies, Braddock, Pa.

**ALL-STEEL CENTRAL PROPORTIONING PLANTS FOR ROAD WORK**

In the illustrated literature of the Erie Steel Construction Co., Erie, Pa., concrete road contractors will find much instructive information regarding the all-steel AggreMeter, a machine for correctly proportioning sand and stone for concrete road construction.

**STEAM SHOVELS AND DREDGE TEETH**

The American Manganese Steel Co., Chicago Heights, Ill., has issued an interesting 16-page booklet describing in detail its manganese steel wearing parts for steam shovels and dipper dredges, with particular reference to dipper fronts and teeth.

**GAS LOCOMOTIVES FOR HIGHWAY CONSTRUCTION**

In an interesting booklet, "Camera on the Trail of the American Gas-O-Motive," the Hadfield-Penfield Steel Co., Bucyrus, Ohio, gives a number of views showing the various uses of this type of gasoline locomotive in contracting work.

**A COMPLETE ELECTRIC DRILL CATALOG**

The Black & Decker Mfg. Co., Towson Heights, Baltimore, Md., has just issued a new miniature catalog giving short but complete descriptions of its portable electric drills, screw drivers and socket wrenches, electric grinders, safety cleaning machine and electric valve grinders.

**SPECIAL BULLETIN ON POWER SCRAPERS**

Contractors interested in economical grading should secure a copy of Bulletin L-118 from Smith & Sons Manufacturing Co., 1512 Guinotte Ave., Kansas City, Mo., describing in detail Roytrac 20-cubic-foot capacity wheeled scrapers.

**A ONE-YARD GRAVITY DUMP BODY**

In Circular 118, the Heil Co., 1243 26th Ave., Milwaukee, Wis., describes in detail its \$100 one-yard gravity dump body, made of No. 12 gage steel and electrically welded.

**WATER-TIGHT EXPANSION JOINTS FOR ROADS**

A sample of Elastite and data covering its use as an expansion joint for concrete and block type pavements may be secured by writing to the Philip Carey Co., 9 Wayne Ave., Lockland, Cincinnati, Ohio.

**AN IMPROVED ROAD PLANE**

Road contractors and superintendents interested in efficient road drags should secure the literature of the Angus McCallum Corp., 1339 Clinton St., Detroit, Mich., describing the McCallum improved road plane, which is claimed to leave the roadway as smooth as a pavement.

**PORTABLE CONCRETE MIXERS**

In a 16-page three-color catalog, the Archer Iron Works, Western Ave., and 34th Pl., Chicago, describes in detail the Archer Junior mixer and other portable mixers of the Archer line.

**ELECTRIC HOISTS**

The literature of the S. Flory Manufacturing Co., Bangor, Pa., gives details regarding the value of Flory double drum electric hoists for contractors.

**ADJUSTABLE STEEL FORMS FOR CONCRETE WORK**

The illustrated catalog of the Reichert Metal Concrete Forms Co., 1200 Weil St., Milwaukee, Wis., describes the advantages of these forms over wooden forms for concrete construction.

**GASOLINE POWER-PLANTS**

The Climax Engineering Co., Clinton, Ia., in its latest catalog describes the use of its 50-h.p. gasoline engines in contractors' service.

**APPLYING ROAD OILS**

The Kinney Manufacturing Co., 3529 Washington St., Boston, Mass., in its illustrated literature describes the advantages of its combination auto heater and distributor for bituminous road work.

**A TIME-SAVING CONCRETE MIXER**

An efficient concrete mixer mounted on a motor truck, thus saving time, labor and equipment in concrete road construction and repair, is described in detail in the literature of the Truckmixer Co., 428 Grand Ave., Milwaukee, Wis.

**CONSISTENT CONCRETE PAVERS**

Quotations and bulletins describing the Smith pavers, which are claimed to have low up-keeping and long life, may be secured by writing to the T. L. Smith Co., 1014 32nd St., Milwaukee, Wis.

**CONTRACTORS' LOCOMOTIVES**

Contractors having in mind bidding on jobs needing industrial steam locomotives or heavier types, should secure full information from the H. K. Porter Co., Pittsburgh, Pa.

**CRANE EXCAVATORS**

Contractors interested in an excavating crane having a capacity of 24,000 pounds at 12-foot radius, equipped with a standard boom 35 feet long, should write for Crane Bulletin CR-6, issued by the Koehring Co., Milwaukee, Wis.

**STEAM SHOVEL SERVICE**

In Bulletin 111, the Thew Shovel Co., Lorain, O., gives facts regarding the service of type O shovels and cranes equipped with continuous treads.

## CONTRACTORS', ENGINEERS' AND MANUFACTURERS' NOTES

### New Officers of Climax Engineering Company

The Climax Engineering Company, Clinton, Iowa, is a subsidiary of the G. W. Dulany Trust, being practically owned entirely by the Trust. G. W. Dulany, Jr., has been president of the Climax Engineering Company since its organization in 1915, and has likewise been chairman of the Board of Trustees of the G. W. Dulany Trust. The duties of the latter position have prevented his actively and effectively functioning as President of the Climax Engineering Company, whose business has so grown that it requires the presence of an active president, to lessen the burden and responsibility on the Vice-President, C. B. Stebbins.

George W. Cravens, formerly of Westfield, N. J., has been elected President of the Climax Engineering Company, and assumed his duties on February 1, and Mr. Dulany has been elected chairman of the Board of Directors. C. B. Stebbins was reelected Vice-President, R. D. Upton, reelected Treasurer, and J. M. Thomsen, reelected Secretary.

With the addition to the active executive management, the Climax Engineering Company will be in a position to go ahead with the broader plans recently formulated. Mr. Cravens, the new President, was for many years with the General Electric Company, and has had a wide engineering and commercial experience.

### Lang Retires as President of Lakewood

At the annual meeting of the Lakewood Engineering Company, Cleveland, Ohio, Charles F. Lang retired from the presidency. The company is now officered and managed by men who have been connected with it for many years. Reports from the field force show every indication of an increase of business in all departments, particularly in the paving and general construction fields. It has already been necessary to increase the factory force to meet the improved demand.

### Captain H. G. A. Tarr Dies

Captain Horace G. A. Tarr, Manager of R. D. Wood & Company, Philadelphia, Pa., manufacturers of cast iron pipe and foundry specialties, died early this month at the age of 76. He was formerly a vice-president of the Pullman Company and the Otis Elevator Company.

By profession, Captain Tarr was an engineer. He engaged in many irrigation projects and other large works both in this country and in Europe. He was an amateur painter of some distinction and was a founder of the Lambs and one of the original members of the Players Club. His military title was derived from

his services on the staff of General Sherman. He was wounded during the march to the sea.

### New Branch Offices of Asphalt Association

The Asphalt Association, 25 West 43rd Street, New York City, has announced the opening of branch offices at Raleigh, N. C., with Harry P. Grier in charge, and at Atlanta, Ga., with James R. Valk in charge, and the moving of its Canadian office from Toronto to Albany, N. Y., where Germain E. Graham, formerly Deputy City Engineer of Albany, will be in charge as District Engineer. Mr. Graham will not only look after the Asphalt Association's interests in Canada, but will cover the state of New York.

### Illustrations from Firestone

In the valuable and instructive article, "The Care of Motor Truck Tires," which appeared on pages 52-53 of the February issue of the CONTRACTORS' & ENGINEERS' MONTHLY, the illustrations showing the destructive effects of chains and the disintegrating effect of bad roads and overloading were furnished the CONTRACTORS' & ENGINEERS' MONTHLY through the courtesy of the Firestone Tire and Rubber Company, Akron, Ohio.

### New Portable Reciprocating Feeder

The Weller Manufacturing Company, Chicago, Ill., manufacturer of all types of conveying machinery, has just placed on the market a portable reciprocating feeder to take care of materials delivered in hopper-bottom cars. This feeder eliminates the digging of pits, and cars can be unloaded at a point most convenient to where the materials are required. The machine operates above the track and handles sand, stone, gravel, coal, ore, etc., saving the labor of several men. It is claimed that one man can easily handle the job of unloading and delivering the materials to any style of loader or elevator. The feeder is mounted on roller bearings and can be easily slipped under the car. A motor or engine is mounted on the platform, making it a complete unit.

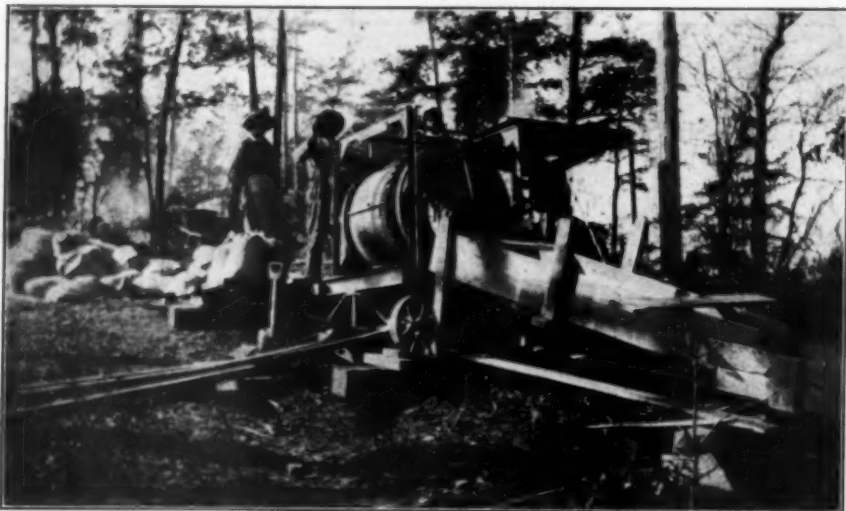
### New Cast Iron Pipe Office

The United States Cast Iron Pipe & Foundry Company, Burlington, N. J., has announced the opening of a new office at the Interstate Building, Kansas City, Mo., in charge of E. W. Pratt, Sales Agent.

### Explosives Prices Lower

The Hercules Power Company, Wilmington, Del., on February 17 announced a reduction of prices on high explosives, permissibles and blasting powders.

## Machinery Plus Organization Makes the Contractor



**A T-S RANSOME BANTAM MIXER POURING CONCRETE FOR DERRICK FOUNDATIONS AT THE PORT OF BIRMINGHAM, WARRIOR RIVER, ALA.**

According to A. F. Felix, Port Warden, this little mixer turned out 72 cubic yards of concrete in a 9-hour working day. The mixer was sold by Henry C. Ashmead, Birmingham, Ala.



**A 3½-TON KELLY-SPRINGFIELD TRUCK FITTED WITH A 3-YARD BODY AND A HEIL HYDRO-ROIST FOR THE WISCONSIN HIGHWAY COMMISSION**





GRADING ON A MISSISSIPPI LEVEE JOB OF E. H. POLK, BENOIT, MISS.

The mule-drawn dump-carts were loaded by a Stroud elevating grader drawn by a Holt 5-ton tractor. The latter was sold by the Halloran-McLean Tractor Company, Inc., Memphis, Tenn.

### The Roman Roads

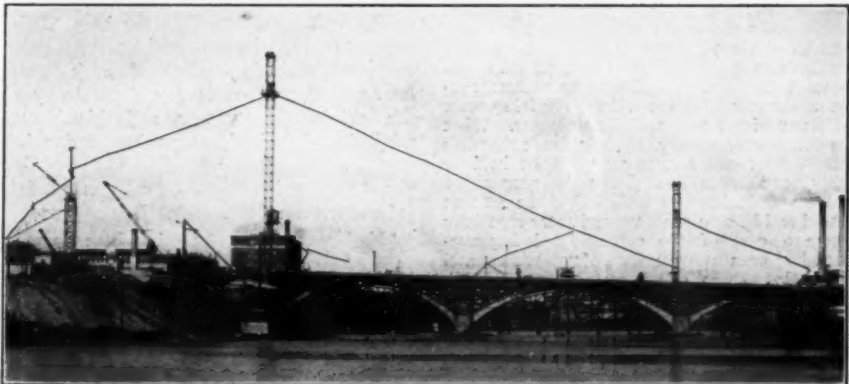
The manner, methods and the modes  
Of building Caesar's Roman roads  
Are hidden by their early date,  
And archaeologists debate,  
In terms unmeaning to the mob,  
Just how old Caesar "done the job."

But there are certain episodes  
Linked with the paving of these roads  
Which any half-way occult eye  
Can see at once if it will try.  
For instance, Casca (jealous brute)  
Inspired an injunction suit.  
The Knockers' League of Southern Gaul  
Just couldn't stand for roads a-tall.  
The village merchants were afraid  
Good roads would hurt their local trade.  
Of course they couldn't meet the terms  
Of those mail order Roman firms.  
The legislation was delayed,  
While Brutus urged a change of grade.

And Cassius called it a disgrace  
To have this pretty country place  
All littered with a greasy bunch  
Of Tuscan workmen eating lunch.  
He swore because they would not let  
Him drive before the grout was set.  
And Caesar, worried half to death,  
Was called a grafter with each breath.

But these unpleasant episodes  
Stopped with completion of the roads;  
Young bloods from Rome to Brittany  
Went joy riding twice a day.  
The merchants in the far backwoods  
Put in a line of chariot goods.  
The farmers worked a whole lot less,  
And one and all they rose to bless  
Friend Julius. And the folks in town  
They offered him a kingly crown.

—Ernest Kidder.  
(Michigan Roads and Forests.)



INSLEY SPOUTING SYSTEM USED ON NORTH AVENUE BRIDGE, MILWAUKEE, WIS.

The Boeckh-Lewe Machinery Company, Inc., sold this complete plant to the contractors, Klug & Smith

## Legal Decisions in the Contracting Field

Edited by A. L. H. Street, Attorney-at-Law

### Interest Recoverable on Construction Contracts

A decision of the California Supreme Court accords with the weight of judicial authority throughout the country by holding that "the general rule is that interest is allowable from the time the sum in suit becomes due, if the same is certain or can be made certain by mere calculation. In actions upon contracts the sum due or the means of calculating the sum are usually clearly provided for in the contract, and interest is consequently allowable from the time the sum in suit becomes due." (Gray vs. Bekins, 199 Pacific Reporter, 767.)

### Legislature May Validly Authorize Issuance of Interim Warrants

A statute authorizing the issuance to municipal improvement contractors of interim warrants covering 90 per cent of the appraised value of completed work and bearing 6 per cent interest, pending issuing of district bonds or warrants, is valid, holds the Utah Supreme Court in the case of Bair v. Montrose, 199 Pacific Reporter, 667. In the course of its opinion the Court says:

"As to the constitutionality of the statute providing for the delivery to a contractor of interim warrants we have no doubt. Indeed, the plaintiffs practically concede that the Legislature had the power to enact the statute and that ordinarily its provisions with regard to the issuance and delivery of interim warrants to the contractor would not be an infringement upon any of the rights of the taxpayer. What the defendant seriously contends for is that this provision of the statute may not be held to apply to districts created for the purpose of making public improvements before the act was passed and became effective, and more especially where a part of the contemplated improvement had been completed. Defendant's counsel argue that the estimated cost of the improvement will be exceeded because of the fact that the interim warrants, when issued, bear interest at the rate of 6 per cent per annum, and there-

fore, to that extent at least, the rights of the taxpayer whose property is affected are impaired.

"In so far as the practical operation of the provisions of the statute under consideration is concerned, we do not think the position taken by counsel is tenable. The exercise of the right to issue interim warrants undoubtedly enables the contractor to more readily finance himself in carrying on the work to a successful completion, and therefore would have a tendency to inspire competitive bidding, and thereby ultimately reduce the cost of the improvement to the taxpayer."

### Power of Public Authorities to Complete Work Under Forfeited Contract

Where a contract to construct a public improvement is forfeited, the public authorities are under no obligation—unless specially imposed—to relet the contract to the lowest bidder, but may proceed to finish the work by day labor under their own direction. It is so held by the Maryland Court of Appeals in the case of Trustees of Sanitary District of Chicago v. Poe et al., 114 Atlantic Reporter, 714.

Plaintiffs sued the receivers of a surety company to recover on a drainage improvement contractor's bond after the work had been partly done and the contract had been forfeited for delay in performance. It was unsuccessfully asserted on the part of defendants that the plaintiffs were legally bound to relet the unfinished work to the lowest bidder, in order that the liability of the original contractor and his surety might be minimized, rather than to do what was done—finish the work themselves. The Court quotes from an authority on municipal corporation law:

"If, however, a contract has been properly awarded to the lowest bidder, who has defaulted and abandoned it, a new advertisement and award is not necessary; the original contractor having made himself liable for the extra expense incurred."

Good engineering is the only safe insurance against waste in highway construction.

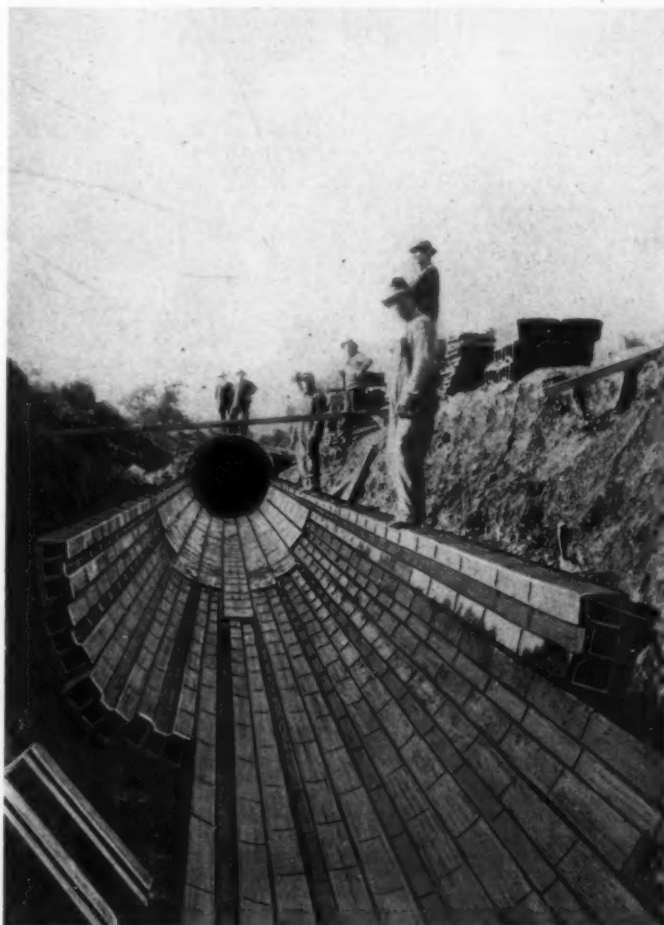
—Highway News Digest.

## The Construction of Segment Block Sewers

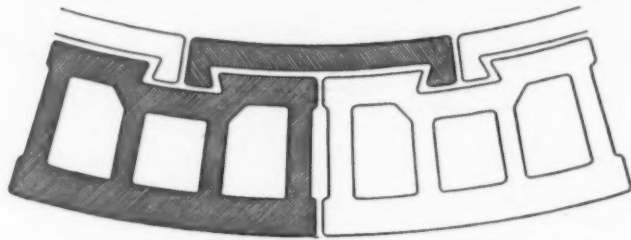
**S**TRENGTH of design in all sewer construction requires serious consideration by both the engineer and the contractor, more than does any other factor entering into the building of sewers of large diameter, as the reputation of both depends upon the structure's being capable of resisting the stresses which will be imposed on it both from external earth loading and from internal pressure which is, at times, developed during excessive storms or by obstructions. A superior quality of clay is used in the manufacture of segment sewer blocks made by the Robinson Clay Products Company, Akron, Ohio. The blocks are made of a highly glazed

and thoroughly vitrified Ohio shale and clay, which is impervious to water and which will not deteriorate or decompose under chemical action, and forms a smooth surface.

The Robinson segment sewer block is so placed during construction as to give the maximum resistance at the point of the greatest stress, and the ultimate strength of the structure is greater than is necessary to withstand the forces which will be encountered. The strength is not due solely to the thickness of the shell, as in the case of brick or concrete, but chiefly to the proper interlocking of inner and outer courses, the two being firmly cemented together



LAYING A WATER-TIGHT SEWER WITH 72-INCH INVERT, IN CLEVELAND, OHIO



SECTION OF BLOCKS FOR 60-INCH SEWER

with Portland cement mortar, which insures water-tightness and provides staggered joints both transversely and longitudinally, so that at no point in the circle does a mortar plane exist reaching through the entire structure. Joints are made so as to secure the best bond possible, all joint faces being deeply scarified. The longitudinal faces of the blocks are mortared, between the inner and outer blocks a mortar bed exists, and, as the second course is pressed and tapped into place, a uniform and well-sealed joint is secured. It is not necessary with this type of segment sewer block to make the joint by a sliding motion or to obtain it by letting blocks settle into place when the forms are removed. The mortared surfaces of the blocks are exposed at all times during construction, and a good bond is easily secured.

As soon as the first outer block is laid in the bottom of the invert, a sub-drain is provided, eliminating an independent drain, which is always necessary where wet trenches are encountered. Under extremely bad conditions the ends of the outer blocks may be left open and will form a soil drain entirely independent of the sewer itself, owing to the mortar joint existing between the two courses.

#### Details of the Work

The construction of a segment block sewer can follow the excavation of the trench very closely. A line of outer blocks is first laid along the invert to the established grade. On each side of this, successive lines of outer blocks are laid to the springing line, the workmen being

guided by a mason's line and the proper size template. A thin mortar is applied to the inner face of the blocks, and the inner blocks are then placed in position in this mortar bed, commencing at the invert and continuing to the springing line. In constructing the arch a light collapsible form is used, and when it is set in proper position, the laying of the inner blocks is continued from the springing line over the form. The mortar is then applied on the exposed face and the outer blocks placed thereon, the operation on the arch being the opposite to that on the invert. The form is then lowered and advanced for further work. Backfilling can be started immediately after the removal of the form.

Special care should be taken to make the longitudinal joints between the outer blocks in the invert in a workmanlike manner and to have the backfilling material thoroughly tamped up to the springing line. The weights and measurements of Robinson segment sewer blocks vary for the size of the sewer. For a 30-inch sewer ten blocks are required to the circle, the inner blocks being  $\frac{3}{4}$ -inch in thickness and 9 inches wide. The outer block is  $3\frac{3}{4}$  inches in thickness and 9.6 inches in width. The completed sewer is  $4\frac{1}{4}$  inches, and the thickness of the completed wearing surface is  $1\frac{1}{4}$  inches. The weight per lineal foot of the sewer is 250. For a 72-inch invert such as illustrated in the Cleveland, Ohio, picture, 20 blocks are required to the circle, the inner blocks being 1 inch thick and 11 inches in width. The outer block is  $6\frac{1}{4}$  inches thick and 11.4 inches wide. The completed sewer is  $7\frac{1}{2}$  inches thick with a  $2\frac{1}{4}$ -inch wearing surface, and weighs 940 pounds per lineal foot.

## A 2,000-Year-Old Definition of an Engineer

In an address before the Western Society of Engineers, John W. Alvord, past president of the society, gave a definition of an engineer made by Marcus Vitruvius, who wrote 150 years B. C.

"He should be a good writer, a skillful draughtsman, versed in geometry and optics, expert at figures, acquainted with history, informed on the principles of natural and moral philosophy, somewhat of a musician, not ignorant of the sciences, both law and physics, nor of the motions, laws and relations to each other

of the heavenly bodies.

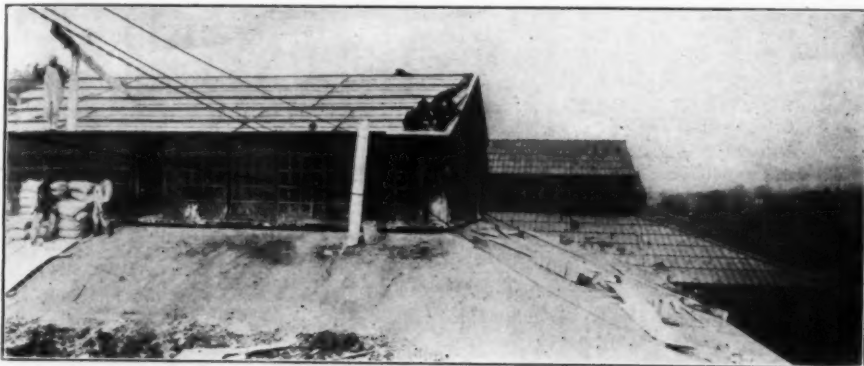
A moral philosophy will teach him to be above heaviness in his dealings and to avoid arrogance. It will make him just, compliant and faithful to his employer, and, what is of highest importance, it will prevent avarice gaining an ascendancy over him, for he should not be occupied with thoughts of filling his coffers, nor with the desire of grasping everything in the shape of gain, but, by the gravity of his manners and a good character, should be careful to preserve his dignity."

## Replacement Roofing for Industrial Buildings

**F**REQUENTLY the original wooden or other types of roofs on industrial buildings become practically useless through weathering, and require replacement. In selecting a replacement roofing, it is well to consider its fire-proof qualities, for not only will a fire-proof roof usually outlast other types but it will lessen the danger of loss from fire and reduce insurance rates. The Metropolitan System of fire-proof roof construction, which is one of the oldest acceptable systems of fire-proof construction still in use, has peculiarities which make it exceptionally desirable for replacement work. The Keystone Gypsum Fireproofing Corporation, 1328 Broadway, New York City, which manufactures this roofing, states that it has remarkably attractive features in connection with new work, but as this article is to deal particularly with replacement work, we will outline only the particular advantages

pulled and tied down. The slab was then poured and the forms were removed. It is perfectly safe and practical to remove the forms within sixty minutes of the time the composition is poured, as by that time the slab has developed the full live load capacity for which it is designed. This first bay of the new roof was then promptly waterproofed and the temporary roof under it was moved over its new position beyond the second bay, the crew in every case being so organized that all hands had continuous work, which, of course, reduces the required time to a minimum.

Because the Metropolitan System roofing weighs but four pounds per square foot per inch of thickness, it has been found in every case that has come to the writer's attention, whether the trusses were designed for corrugated iron, wood sheathing, concrete, or concrete tile, that they were invariably strong



INSTALLING A FIRE-PROOF ROOF ON ONE OF THE BUILDINGS OF THE BALDWIN LOCOMOTIVE WORKS

dealing with replacement and those which are common to both replacement and new work.

Several very large manufacturing concerns have found it distinctly to their advantage to use the Metropolitan System of roof construction on buildings originally covered with wood sheathing, corrugated iron, concrete or tile. The method of procedure has been the same in every case. If manufacturing processes were to be carried on during the replacement, a temporary roof of wood sheathing was erected below the original roof. In some cases it was waterproofed with tar paper; in others, simply covered with tarpaulins; and in still others, where a small amount of rain would not make any serious difference, the boards were lapped like shingles; but in every case the temporary roof was at least two bays wide. When completed, one bay of the original roof was removed, forms for the slab suspended in place, the wall members braced (either by angle irons or pipe struts, as conditions seemed to indicate), and the cables

enough to carry the load of the slab, without undue strain, although, of course, it is easy to imagine trusses designed so light that they cannot carry more than corrugated iron, in which case the trusses would have to be reinforced, probably with plates on the bottom chord.

Another reason why this system has become so popular is to be found in the fact that the purlin spacing is not always uniform, but as Metropolitan roofing is designed on the principle of the catenary, and the cost of the cables is relatively small, it is an easy matter to install enough cables to take care of the widest purlin spacing.

The objection has been raised that materials and machines might be damaged by dripping from the slab during the process of pouring. This would be true in some cases if the materials and machines were not protected. The writer has in mind one case of a roof over a paper machine which was operated successfully while the roof was being installed directly over it.



The machine was, of course, carefully protected by a temporary wooden roof covered with tar paper. It has been found from practical experience that if a building is covered with one of the above-mentioned materials, and the roof has been changed to a Metropolitan slab, it takes less coal to heat the building to a working temperature during the winter months than it did before the change was made. Exhaustive data on this phase of the subject have been carefully prepared by Professor C. L. Norton of the Massachusetts Institute of Technology.

Regarding comparative costs, it is very diffi-

cult even to strike an average, as each case must be figured on its merits. The cost is materially affected by the amount of protection required. Owners have found it to their advantage to protect the machines and materials themselves, because the Metropolitan contractors are obliged to carry expensive insurance covering damage to costly machines. Experience, however, has shown that on account of its durability (and there are plenty of jobs which may be seen than offset the losses of December. five years without deterioration) Metropolitan is economical in the long run.

## An Asphaltic Concrete Job in Norfolk, Nebraska

By W. H. Campen

The Omaha Testing Laboratories, Inc., Omaha, Nebr.

**D**URING the month of September, 1921, the Omaha Testing Laboratories supervised the construction of about 60,000 square yards of asphaltic concrete at Norfolk, Nebr. The materials used in the asphalt course were Sioux Falls granite chips, blow sand, pit run gravel, and Texaco asphaltic cement. The chips all passed a 1/2-inch screen, and the asphalt had a penetration of about 56 mm. at 77 degrees F., and a ductibility of about 50 cm. at the same temperature. The blow sand and pit run gravel were so mixed as to produce a good sheet asphalt sand mixture.

The writer laid the pavement in accordance with his own ideas of an asphaltic concrete mixture. He believes that the best pavement of this type is laid when the chemist prepares a sheet asphalt mixture and then adds into it about 35 or 40 per cent of stone chips, either Joplin chats, or Sioux

Falls granite chips. Following out this idea the asphalt laid contained the following per 100 pounds:

35	pounds chips
49 1/2	pounds mixed sands
7	pounds limestone dust
8 1/2	pounds asphalt

In other words, the mixture was about 65 per cent sheet asphalt and 35 per cent stone chips.

A pavement of this type is just as hard as those containing more stone, because it is so dense. It weighs about 137 pounds per cubic foot. On the other hand, less cracking will occur than with coarser pavements because it will have properties more nearly like those of sheet asphalt.

The completed pavement looks very good, and the townspeople are very much pleased with it.



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## Portable Gasoline-driven Compressors

TO meet the ever-increasing demand for portable compressors by contractors and others who employ air tools in connection with their work and require equipment to be easily moved from place to place, the Traylor Engineering and Manufacturing Company, Allentown, Pa., offers several types of portable compressors, notable among which is its gasoline-driven outfit.

By the use of their compressors of the portable type, much time and money can be saved on many jobs, for with them no foundations are required, extensive pipe lines and other auxiliary equipment are eliminated, and when one job is completed, the compressor plant can be sent to another without delay and the expense of dismantling. The field of the portable air compressor is practically unlimited, and the contractor who owns one finds himself in a position to undertake many jobs and do them for less money and in quicker time than his less fortunate competitor. The caulking of water- and gas-mains, driving rivets, tamping concrete and earth, running air drills and rock cuts and operating a cement gun are a few of the jobs for a portable conveyor outfit when equipped with the necessary tools.

A portable compressor plant, to be of real service to its owner, must be complete in itself, so light that it can be moved readily, and of such rugged construction and reliability that it can be operated economically under the most adverse conditions. The outfit illustrated herewith is a standard Traylor portable gasoline-driven compressor. The machine is very compact and consists of a tractor-type slow-speed motor direct-connected to the compressor by spiral gears. This machine has a piston displacement of 294 cubic feet of free air at 240 r.p.m. and actually delivers 232 cubic feet at 50 pounds pressure. The compressor is of the straight-line type, having the cylinder fitted with an extra light steel disc inlet and discharge valves of very large area and special design. The motor is equipped with a cooling radiator of large size, a fan and a circulating pump. The motor is fully enclosed, and covers are provided to give easy access to the valve gear and crank case. The automatic governor is gear-driven completely encased, and gives absolute speed control at all times.

The compressor is driven by means of spiral gears, the main gear being mounted on the compressor crank-shaft and the spiral pinion on the pinion shaft, which is direct-connected to the motor crank-shaft by means of a flexible coupling, thus assuring perfect alignment of the spiral gears under all normal conditions. This type of drive is the same which has proved so satisfactory for motor trucks and is commonly known as the "worm drive."

Owing to the method of transmitting the power from the motor to the crank-shaft, and the correct balancing of the fly-wheel, vibration is reduced to a minimum. The entire mechanism is enclosed in a dirt-proof case and runs in oil.

The automatic unloader that can be set for any desired pressure is attached to the suction of the compressor. The speed is controlled by the motor governor already mentioned. A bronze pressure pump of the gear type is direct-connected to the compressor crank-shaft by means of a flexible coupling and is supported by a bracket attached to the main frame. This pump not only supplies the cooling water for the air cylinder, but is of ample size to supply a Cement Gun with the necessary water at 60 pounds pressure, or can be used for any small pumping job.

The entire outfit is mounted on an all-steel frame of special design and light weight, that has steel wheels with extra wide tires. The front axle is held to the frame by means of a king-bolt so as to allow the front wheels to swivel. A short tongue is provided for hauling the outfit from place to place.

An air receiver, 22 inches in diameter by 4 feet long, tested to 150 pounds pressure and complete with all necessary piping, safety valve, pressure gage, drain cocks and outlet valves, is mounted on the truck, as is also a gasoline tank of 30 gallons capacity. A tool box of ample size is furnished. The weight of the complete outfit is approximately 8,000 pounds, and its capacity is sufficient to operate two hand rock drills, riveting-hammers, or other pneumatic tools in proportion.

### The Bridge Builder

An old man, traveling a lone highway,  
Came at the evening cold and gray,

To a chasm deep and wide.

The old man crossed in the twilight dim,

For the sullen stream held no fears for him,  
But he turned when he reached the other side

And builded a bridge to span the tide.

"Old man," cried a fellow pilgrim near,

"You are wasting your strength with building  
here.

Your journey will end with the ending day

And you never again will pass this way.

You have crossed the chasm deep and wide,

Why build you a bridge at eventide?"

And the builder raised his old, gray head,

"Good friend, on the path I have come," he  
said,

"There followeth after me to-day

A youth whose feet will pass this way.

This stream, which has been as naught to me,

To that fair-haired boy may a pitfall be.

He, too, must cross in the twilight dim.

Good friend, I am building this bridge for him."



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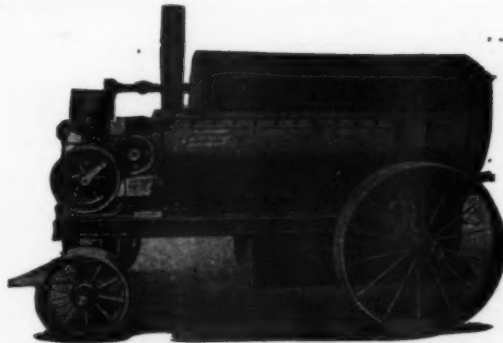


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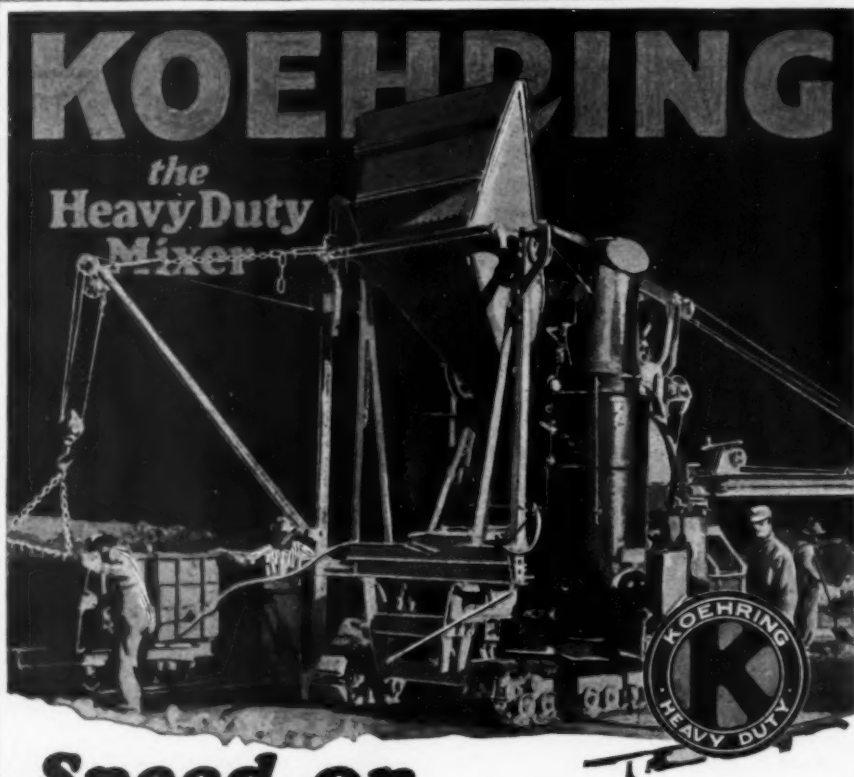
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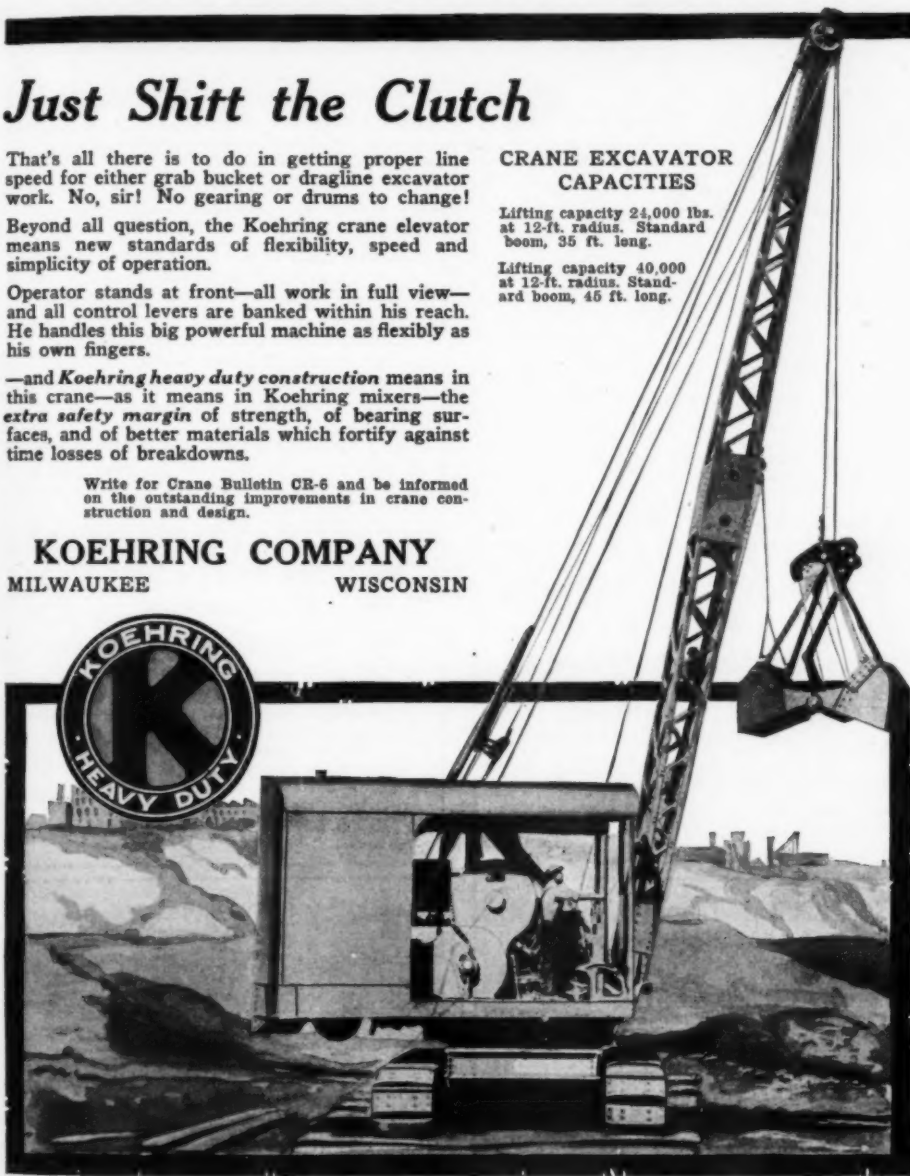
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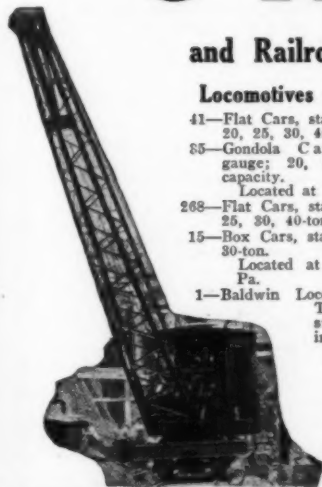
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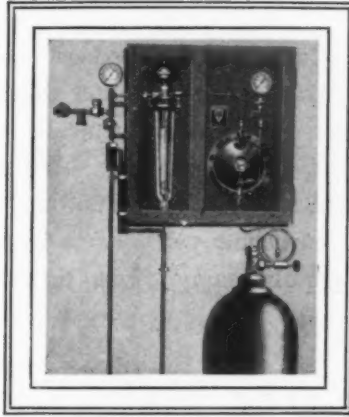
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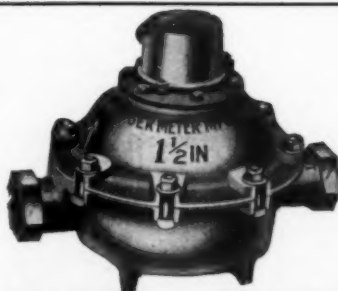
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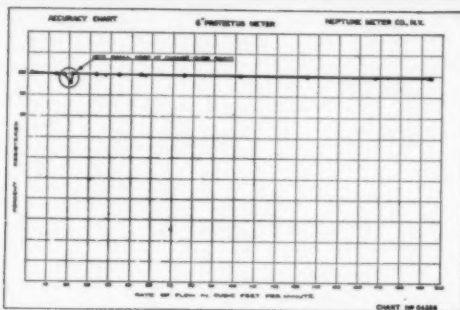
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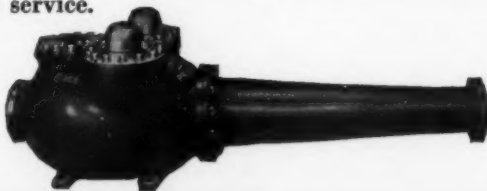
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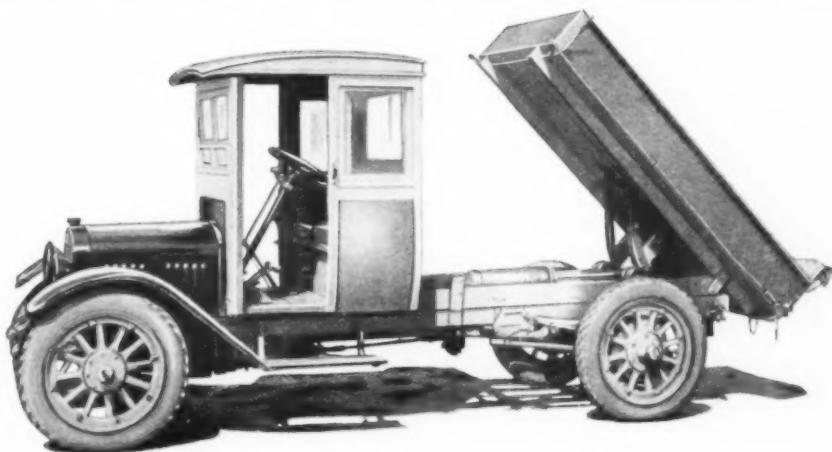
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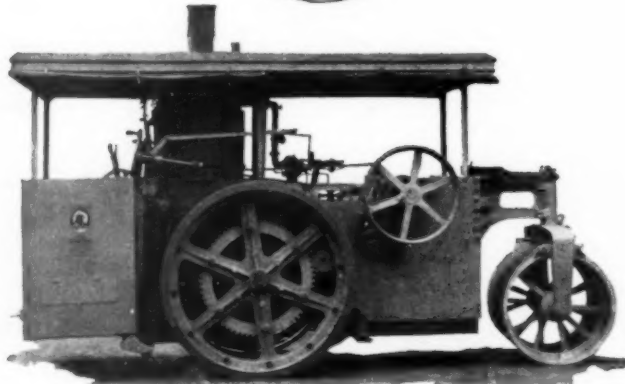
This is a real GMC, embodying all the features of GMC superior construction. Write for other details.

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New Iroquois 12-Ton Macadam Roller  
(Vertical Boiler Type)

## More power—less cost—longer life

That's what revolutionary changes in design have meant to the New Iroquois 12-Ton Macadam Roller. Every change represents added efficiency and economy of operation.

Greater power is gained through higher steam pressure and larger engine cylinders. Longer life and less operating expense comes from simplified and improved mechanical construction.

The New Iroquois has a vertical boiler *that supports no weight but its own*. Rack and strain—so fruitful of leaks in the old type roller—are thus eliminated. Every working part, in fact, is a separate unit resting on a steel frame.

Don't buy a new roller until you have examined the complete specifications of this wonderful New Iroquois. Write for them at once. Also ask for Bulletin Nos. 8, 6 and 5.



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